

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

VOLUME 4, NUMBER 28

JULY 13, 1987

► COMMUNICATIONS INDUSTRY

Contel buys COMSAT divisions, Equatorial

Equatorial deal adds VSAT market power.

BY BOB WALLACE
Senior Editor

ATLANTA — Contel Corp. subsidiary Contel ASC last week agreed to acquire financially troubled VSAT maker Equatorial Communications Co., a move analysts say will make Contel one of the leading vendors of very small aperture terminals.

Contel ASC — the former American Satellite Co. — which became a wholly owned subsidiary of Contel Corp. in Au-
See page 36

Sale of COMSAT units finishes merger saga.

BY PAM POWERS
Senior Editor

ATLANTA — Contel Corp. last week terminated its merger agreement with Communications Satellite Corp. by agreeing to acquire — at a premium — portions of two loss-saddled COMSAT divisions. Contel also hinted it intends to shed at least one unprofitable business unit.

Contel ended months of negotiations, which began in September when the
See page 38

Contel Corp.: A corporate portrait

	1986 Revenue	Earnings		1986 Revenue	Earnings
Telephone Operations • Twenty-eight regulated local telephone companies	\$1.835b	\$234m	Last week's acquisitions: (Through Contel ASC)		
Federal Systems • Sales of computer and communications gear to federal government	\$297m	\$13m	Equatorial Communications Co. VSAT networks	\$50.9m	(\$67.8m)
Information Systems • Business Networks — Large PBX-based networks • Contel ASC (formerly American Satellite Co.) — Satellite and fiber-optic networks • Contel IPC — Markets trading turrets • Texocom — Markets equipment to telephone companies	\$580m	\$22m	COMSAT Technology Products, Inc.'s VSAT network operations	\$10m (approx.)	NA
Business Systems • Contel Executone — Interconnect • Contel Computer Systems — Small business computers	\$314m	(\$12.5m)	COMSAT International Communications, Inc.'s international private network operations	\$12m (approx.)	NA

NETWORK LINE

News

► The U.S. State Department prepares to build a \$500 million secure network to move data, voice and video traffic worldwide. Page 2.

► Northern Telecom unveils an enhancement that

doubles the call processing power of its DMS-100 central office switch. The company promises to apply the new technology to its SL-100 PBX. Page 2.

► US Sprint President Charles Skibo resigns, and the company announces that its second-quarter financial results will show a one-time charge of \$350 million. Page 2.

► Bell Atlantic announces a major corporate restructuring, realigning divisions to cut costs and consolidate its regulated and nonregulated units. Page 2.

Features

► Chuck Garrison oversees communications at the world's most sophisticated, and perhaps most frantic, automated trading facility, the Chicago Board Options Exchange. Page 28.

► Advanced voice-messaging systems include features such as automated attendants and distribution lists to allow users to broadcast messages. Here's a look at two such systems. Page 39.

► LOTUS DEVELOPMENT CORP.

Users still await networked 1-2-3

Firms bend rules to make do.

BY MARY PETROSKY
West Coast Correspondent

CAMBRIDGE, Mass. — Lotus Development Corp. has missed the target shipment date for the local-area network version of its popular 1-2-3 spreadsheet, but users are getting along without the product by breaking the software's copy protection and installing it on network servers.

In August, Lotus introduced the network version of 1-2-3, dubbed the Networker, and said it would ship the product by the first quarter of this year. The Networker is still under development, according to a Lotus spokeswoman, and the company will not comment specifically
See page 8

► HIGH-CAPACITY TRANSMISSION

Big users flock to AT&T T-3 service

BY JOSH GONZE
Staff Writer

WASHINGTON, D.C. — At least 20 large companies have signed up with AT&T for 45M bit/sec T-3 service linking customers directly to AT&T network nodes, according to tariff plans AT&T has filed with the Federal Communications Commission.

The FCC filing describes T-3 contracts AT&T has negotiated with, among others, General Motors Corp., American Airlines, Inc., First Fidelity Investments, McDonnell Douglas Corp., Monsanto Co., ABC and Mellon Bank Corp.

AT&T's Accunet T45 service, a T-3 service that uses a framed DS-3 signal format, is an ultra-high-capacity, 45M
See page 8

SERVICE FOCUS

Tumultuous times for VSAT vendors

BY BOB WALLACE
Senior Editor

Eager to rush headlong into a seemingly lucrative market, many VSAT vendors have jumped the gun. Overestimated user demand for two-way very small aperture terminal network services has triggered an industry retrenchment.

Contel ASC's purchase of COMSAT Technology Products, Inc. (CTP) and planned acquisition of Equatorial Communications Co., along with Hughes Communications, Inc.'s recent purchase of M/A-Com, Inc.'s Telecommunications Division, reveal a continuing consolidation of the two-way VSAT network market.
Continued on page 33

► PACKET-SWITCHING

State Dept. to build secure global network

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The U.S. Department of State is preparing to build a \$500 million secure packet-switching network that will move encrypted data, video and limited voice traffic among 300 U.S. embassies and consulates around the world, State Department officials said last week.

The Department of State Telecommunications Network (DOSTN)

is designed to replace the existing Diplomatic Telecommunications System, a private-line data network that evolved over several decades.

DOSTN will be more robust and dynamic than the inflexible private-line network now in use and will be capable of meeting the growing communications needs of the Department of State, according to DOSTN Program Manager Joseph Stronko, a division chief within the State Department Office

of Communications.

"The existing leased-line network is fast becoming obsolete due to its lack of flexibility, inefficient allocation of dedicated circuits, limited user services, lack of redundancy and limited network management," according to the draft request for proposal issued by the State Department.

"Private lines are more expensive than switched circuits, and they don't allow traffic to be dynamically routed based on the best transmission path available at the time," Stronko explained.

"We want a more distributed and dynamic network that will provide varying levels of functionality based on the needs of users at particular locations," Stronko said.

See page 5

► US SPRINT COMMUNICATIONS CO.

Skibo out, carrier posts big writedown

BY MICHAEL FAHEY
Senior Writer

In a move designed to shift emphasis from growth to cost control, US Sprint Communications Co. last week replaced company President Charles Skibo with Robert Snedaker Jr., former vice-chairman and chief operating officer of Unit-

ed Telecommunications, Inc.

The joint venture's partners, GTE Corp. and United Telecommunications, Inc., reported that US Sprint's financial results for the second quarter of 1987 will include a nonrecurring pretax charge of about \$350 million. This reflects a write-off of some analog network assets and a provision for \$76 million in uncollectible accounts receivable. The write-off will be split evenly between GTE and United Telecommunications.

While it has an impressive record of adding new customers and is on schedule constructing a 23,000-mile digital fiber-optic network, US Sprint has been plagued with back-office problems leading to toll fraud and billing problems, analysts said.

Snedaker, who has 38 years of experience in telecommunications management with the Bell System and United Telecommunications, is

described by industry analysts as a strong manager with experience in day-to-day operations.

"Snedaker is pragmatic and realistic," said Joel Gross, a telecommunications analyst at Dean Witter Reynolds, Inc. "He is bottom-line focused and knows how to run a telephone company."

Skibo worked in marketing and sales for Exxon Corp. and MCI Communications Corp. before joining US Sprint. "He was real aggressive in advertising, and he did do a good job in getting US Sprint's name out as a quality carrier," said Robert Wilkes, an analyst with Brown Brothers Harriman & Co. "But there were problems in the operational end of the business, particularly the billing and accounts receivables.

"The management change represents an effort to bring greater general management expertise to

See page 5

► BELL ATLANTIC

RBHC to restructure business

BY PAM POWERS
Senior Editor

PHILADELPHIA — In an effort to cut costs through consolidation and unify its regulated and nonregulated operations, Bell Atlantic Corp. last week announced a major corporatewide reorganization, slated to take effect Jan. 1, 1988.

Officials of Bell Atlantic said the company will realign its regulated and nonregulated businesses into three divisions, which will be overseen by a chief administrative officer and a chief operating officer. Those executive positions will be created as part of a restructuring of Bell Atlantic's senior management. Task forces within the company are now working to implement the reorganizations, which a spokesman said will not result in any layoffs.

Under the planned restructuring, Bell Atlantic's telephone operating companies — New Jersey Bell, Bell of Pennsylvania, Diamond State Telephone of Delaware, and the Chesapeake and Potomac Telephone Companies — will become part of the existing Network Services Division, reporting to a board of directors and a chief operating officer to be appointed at the end of this year.

See page 5

► CENTRAL OFFICE

Northern enhances CO power

Promises to bring technology to PBX.

BY BOB WALLACE
Senior Editor

NEW YORK — Northern Telecom, Inc. enhanced its top-of-the-line central office switch last week, thus doubling its call processing power, and revealed to *Network World* plans to draw from the new technology to fortify the SL-100, its top-of-the-line private branch exchange.

DMS-Supernode builds on Northern Telecom's DMS-100 central office switch with the addition of a number of new capabilities, including the ability to extend switch programming to telephone company customers. This will enable telephone companies to custom program advanced services, including Integrated Services Digital Network-type offerings.

DMS-Supernode can be used to increase the processing power of current central office switches, be employed as a data base switch add-on or be installed as a signal transfer point to provide advanced calling services. The system can also be configured as a stand-alone node that offers all three of these features.

These same advanced networking features will be made available with the Northern Telecom SL-100, a PBX version of its DMS-100 central office switch that can support 3,000 to 30,000 lines. By replacing the SL-100 main control unit and

See page 36

Table of contents

TOP NEWS

PacTel announces plans to offer voice mail services under the FCC's Comparably Efficient Interconnection rules. **Page 4.**

INDUSTRY UPDATE

The newly formed National Association of Telecommunications Dealers uses its clout and persuades Rolm to support used equipment. **Page 9.**

TELECOM TRENDS

As time goes by, telecom manager Al Weresow perseveres in his mission to establish a T-1 users group. **Page 11.**

DATA DELIVERY/NET MANAGEMENT

The Navy overcomes a multitude of problems to design and construct a regional data center with

broadband networking. **Page 15.**

LOCAL NETWORKING

Sharing of data bases and files is the most important LAN application to users surveyed. **Page 17.**

COMMUNICATIONS MANAGER

A good staff is the indispensable ingredient for a successful communications department. **Page 19.**

NEW PRODUCTS AND SERVICES

Lotus enhances The Application Connection to enable IBM Personal Computer users to extract data from IBM's DB2 data base management system. **Page 23.**

FEATURES **Page 28.**
CALENDAR **Page 38.**

Network World wants to make its news coverage better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Bruce Hoard toll free at (800) 343-6474.

Correction: In Tony Helies' "Con" column that appeared in *Network World's* opinions pages ("Is Ethernet sufficient for factory networking needs?" June 29), two editing errors appeared.

The sentence: "Two advantages of baseband are its large bandwidth and inherent flexibility" should read: "Two advantages of broadband . . ."

Also, the sentence: "Baseband is also more flexible to configure" should read: "Broadband is also more flexible . . ." *Network World* regrets any confusion this error may have caused.

TIMEPLEX

**We've Redefined
The High End
Of T-1 Networking
By Announcing...**

Systems Connectivity Architecture...

the Timeplex philosophy to provide *open systems connectivity* and support to meet current and changing needs of your strategic networks.

TIME/VIEW Unified Network Management System...

an integrated, full-function, multi-user, multi-tasking hierarchical system that, from a single point, enables you to monitor and control your entire network.

TIME/VIEW enhances the native network control capabilities of Timeplex networking products with expert systems and artificial intelligence techniques to ensure maximum network availability. It also embraces non-Timeplex equipment via TIME/VIEW Open Access—a published specification available to customers and vendors. The TIME/VIEW Bridge supports and complements the IBM NetView® network management system.

LINK/100 Series Digital Networking Switch...

a network resource manager that handles up to 144 T-1 lines and up to 15,000 input/output channels—offering true user-initiated switching.

Timeplex Systems Connectivity Architecture is a roadmap to the future. To learn more, contact Timeplex... *the connectivity people*. Send for our SCA brochure, today!



Timeplex, Inc.
400 Chestnut Ridge Road
Woodcliff Lake, NJ 07675
(201) 930-4600

► **ADVANCED SERVICES**

PacTel files CEI plan for voice mail services

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — Pacific Telesis Group last week became the second regional Bell holding company to announce plans to offer voice mail services to business and residential customers in accordance with the FCC's Comparably Efficient Interconnection (CEI) rules.

Bell Atlantic Corp. filed a controversial and still unapproved voice storage CEI plan in May.

Pacific Telesis' CEI filing describes the company's proposed Telephone Answering Service and Voice-Messaging Service it hopes to offer end users through its Pacific Bell and Nevada Bell operating companies, said Steven Harris, Pacific Telesis executive director of federal regulatory relations.

More importantly, the CEI plan outlines how Pacific Telesis will provide other voice-messaging vendors with equal interconnection to the BOC network, which is virtually the only means for an enhanced service provider to tie into customers' premises.

Pacific Telesis said it will offer

other voice-messaging providers "all network functions necessary to offer voice mail service, at a price equal to that which Pacific Telesis will pay for those functions, as required by the Federal Communications Commission's CEI rules," according to the filing. Those functions include interconnection to the telephone network, access to the customers' premises, signaling, telephone number identification and message waiting.

The CEI guidelines were part of the FCC's Third Computer Inquiry rules, which took effect in June 1986. Those rules allow the BOCs to market enhanced services, provided they give competitors the same quality and type of access to local network facilities they enjoy.

Most users and enhanced service providers interviewed last week said they had not read the filing and couldn't comment on the proposed services yet.

Pacific Telesis' telephone answering service would transfer a customer's incoming call to a voice mail machine attached to the BOC central office switch, where the subscriber has stored a recorded message. The voice mail system re-

cords the caller's message, which the called party can later retrieve and delete.

With the voice-messaging service, a user calls a voice mail system and leaves a message for one or more people, which is then delivered to the desired users. In both applications, each subscriber will be assigned a voice mailbox that can be accessed through a pass code.

These services will be most attractive to residential and small business users who do not have telephone answering machines or voice mail systems on their premises, Harris said.

Pacific Telesis said it hopes the FCC will rule on its CEI plan by the fall, which is when U.S. District Court Judge Harold Greene is expected to decide whether the BOCs can enter the information services market, Harris said.

Pacific Telesis and Bell Atlantic need both the FCC's and Greene's permission to offer voice-messaging, which is considered an information service. If Greene does not lift the Modified Final Judgment restrictions that prevent the BOCs from offering information services, the BOCs can petition Greene for a waiver of the prohibitions.

Pacific Telesis hopes to begin initial service trials early next year with residential and business customers in California and Nevada communities served by 1AESS central office switches. □

► **WANG COMMUNICATIONS, INC.**

T-1 bypass tariff filed

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — Wang Communications, Inc. (WCI), the telecommunications subsidiary of Wang Laboratories, Inc., last week filed a tariff with the FCC to establish a uniform set of prices for its existing T-1 bypass services.

The Arlington, Va.-based WCI is a specialized common carrier providing private-line interexchange services to corporate users and long-distance carriers in Los Angeles, San Francisco, Boston, Chicago, Milwaukee and Nashua, N.H.

The 2-year-old Direct Access Service is now priced on a case-by-case basis, requiring WCI to draw up a contract for each customer. The tariff, due to go into effect July 16, will simplify the ordering process by establishing one contract and one price list for all customers.

Direct Access Service provides corporate users with dedicated fiber-optic or digital microwave T-1 links to their long-distance carriers, thus bypassing the local telephone company net, said WCI Marketing Manager Carol Morrison.

"WCI found it took a great deal of time and expense to draw up individual contracts for each customer, even on simple orders, so we decided to file a tariff to alleviate the problem," Morrison said. "We think the tariff will benefit our

customers and us."

As a nondominant carrier, WCI is not required to file tariffs with the Federal Communications Commission unless it wishes to, said Thomas Elcan, a tariff analyst with the FCC. "A nondominant carrier usually files a tariff when it wants to establish a uniform set of prices that are applicable to all customers," he said.

The tariffs will apply to the six cities where the company has intercity fiber-optic or digital microwave networks. WCI will also provide Direct Access to customers in

"The BOCs have been pricing T-1 access as though competition doesn't exist."

other cities requiring two, three or four T-1 circuits, but the service will not be subject to the terms and conditions of the tariff. "Direct Access is designed to facilitate clear digital transmission specially built for each user," Morrison said.

With Direct Access, customers can sidestep Bell operating company local access charges by integrating a number of WATS, private-line and data circuits over a single digital link, according to Morrison. Long-haul T-1 carriers also buy Direct Access in order to package it with their long-distance service, providing end users with end-to-

end service.

Installation charges for the service range from \$7,000 for two T-1 circuits to \$10,000 for four. Recurring charges range from \$3,110 to \$3,820 for 12 months, depending on the number of T-1 circuits. Terms for 18 and 24 months are also available and are listed in the tariff.

WCI is one of several specialized carriers selling bypass services in competition with the BOCs. Network designers and industry consultants predict the demand for T-1 access will continue to grow as the T-1 market heats up.

"A good deal of the demand for T-1 access is rooted in the pricing practices of the BOCs," said Lee Selwyn, president of Economics and Technology, Inc. in Boston. "The BOCs have been slow to offer bulk transmission, and when they finally get around to it, their rates are excessively above cost — as much as 60% above their legal rate of return. The BOCs have been pricing T-1 access as though competition doesn't exist."

Competition is growing by leaps and bounds in major metropolitan areas, said Robert Ellis, president of The Aries Group, Inc. in Rockville, Md. "In New York City alone, you have Manhattan Cable, Inc. and Locate, Inc. providing fiber and microwave bypass to businesses. Their prices are better than the BOCs, and they can deliver service in a couple of weeks, whereas the BOCs have been known to take up to 18 months to turn up a T-1 access circuit." □

NETWORK WORLD

Box 9171, 375 Cochituate Road
Framingham, Mass. 01701-9171
617-879-0700

Editor

 Bruce Hoard
Managing Editor

John Gallant

Features Editor

Steve Moore

Assistant Managing
Editor — News

John Dix

Assistant Managing
Editor — Production

Lisa Guisbond

Senior Editors

Paul Korzenowski

Paula Musich

Pamela T. Powers

Bob Wallace

Senior Writer

Michael Fahey

Staff Writer

Josh Gonze

New Products Editor

Jim Brown

Washington, D.C. Correspondent

Karyl Scott

1273 National Press Building

529 14th Street NW

Washington, D.C. 20045

West Coast Correspondent

Mary Petrosky

501 Second Street

Suite 600

San Francisco, CA 94107

Senior Assistant Features Editor

Robert Mitchell

Assistant Features Editor

Bruce Guptill

Associate Editors

Peter Hoffmann

Beth Lazarus

Copy Editors

Joanne McQuaid

Anne Ryder

Samantha Shubert

Art Director

Dianne Barrett

Informational Graphics Designer

Alan Hopkins

Assistant to the Editor

Cheryl Tynan

Intern

Joy Kalfopulos

Publisher

F. Douglas DeCarlo

Administrative Manager

Mary Fanning

Board Chairman

Patrick J. McGovern

Chief Executive Officer

IDG Communications/Inc.

Axel Leblois

President

CW Publishing/Inc.

James S. Povec

Vice President-Research

Jack Edmonston

Second-class postage paid at Framingham, MA, and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue the last two weeks in December by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-215-630-0500.

Non-qualified subscribers: \$3.00 a copy; U.S. — \$95 a year; Canada, Central & South America — \$110 a year; Europe — \$165 a year, all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. and Canada only to qualified management or professionals who specify and maintain communications equipment and systems, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

PHOTOCOPY RIGHTS: Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 21 Congress Street, Salem, Mass. 01970.

Permission to photocopy does not extend to contributed articles followed by this symbol. ‡

POSTMASTER: Send Change of Address to *Network World*, Box 1021, Southeastern, Pa. 19398-9979.

Copyright 1987 by CW Publishing/Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.



Special requests for reprints and permissions only should be addressed to Nancy M. Shannon, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

State Dept. to build secure net

continued from page 2

The State Department is in the process of soliciting industry suggestions on the latest packet-switching technology and will issue an RFP in October. The five-year contract is expected to be awarded in April 1988.

The State Department began re-evaluating its telecommunications system two years ago, realizing that communications is an essential and strategic part of its work, said Gary Miller, DOSTN program officer. "The State Department's mission is entirely dependent on communications. Our ability to carry out our responsibilities requires rapid, reliable and secure communications, especially during crises when officials in Washington need to be in direct contact with State Department officials on the scene," Miller said.

The State Department plans to award a single contract to a primary contractor. The contractor will be responsible for assembling a team to provide system integration, equipment and circuit acquisition, facilities preparation, engineering, installation, network management and control, logistics, maintenance and training, according to Crandell McDonald, DOSTN contracting officer.

Some of the prime contenders could include IBM, COMSAT International Communications, Inc., AT&T, Boeing Co., Rockwell International Corp., Electronic Data Systems Corp. and GTE Corp.

The State Department has not decided whether it will own the network or lease services from the prime contractor. "We asked potential bidders what it would cost under each scenario. We won't decide until we see the bids," Stronko said.

Much of the design of the net-

work will be left up to the prime contractor, although the State Department has outlined a preliminary architecture. DOSTN will be a five-layer hierarchical network. At the top of the hierarchy will be the State Department headquarters in Washington, D.C. and three regional control centers in Maryland, Florida and California.

The succeeding levels will correspond to the size of the installation and the volume and type of information processed there.

The control centers will monitor network performance and serve as major nodes. Another 33 regional network nodes around the world will be linked by satellite. Seven of those sites will have video teleconferencing facilities.

All data, video and voice communications will have multiple layers of encryption, and the encryption devices will be provided by the State Department, Stronko said. DOSTN will support the Open Systems Interconnect protocol standards and will have gateways into the public switched network and into other government nets. DOSTN will not be linked to the new Federal Telecommunications System 2000, Stronko said.

The network will support communications speeds ranging from 2,400 bit/sec to T-1 1.54M bit/sec. Most of the international traffic will be supported via satellite.

"We'd like to have on-premise earth stations in as many locations as possible, but that will depend largely on the rules of the various PTTs abroad," Stronko said.

"This is going to be a massive systems integration job," said industry analyst Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C. "The worldwide scope of the project makes it exceedingly interesting, and only a handful of companies have the project management skills to pull it off." □

are some real problems," Dean Witter's Gross said.

"The long-distance business is a real tough business," he said. "US Sprint went into it too optimistically. They ramped up demand for service before they had the capability of managing it."

According to George Dellinger, who follows the telecommunications industry for Washington Analysis Corp., the write-down is indicative of the difficulty in bringing together two telecommunications systems. "It is hard to merge two systems, and what is really being highlighted is the difficulty with the billing systems," Dellinger said.

Earlier last week, US Sprint filed tariffs with the Federal Communications Commission calling for a 4.25% cut in long-distance rates, effective Aug. 1. US Sprint, however, did not follow the lead of rivals MCI and AT&T and reduce the cost of its bulk discount long-distance offerings. Analysts said this may also be a sign of US Sprint's plan to take control of its day-to-day operations rather than emphasize growth. □

Bell Atlantic to restructure

continued from page 2

Currently, Network Services handles operator services, training, labor relations, strategic marketing and network planning for Bell Atlantic. The operating companies and Network Services are now overseen by separate management teams.

Bell Atlantic Enterprises Corp. will be renamed Enterprises Services Group, but will continue its focus on financial services, computer maintenance and cellular telephone operations. Remaining in that division will be Bell Atlantic's two leasing companies, Bell Atlantic Systems Leasing International and Bell Atlantic Tricon Leasing; the computer maintenance company Sorbus; and Bell Atlantic Mobile Systems.

A third division, dubbed Enterprises Information Group, will be formed to "manage new strategic initiatives" and other nonregulated lines of business such as software and hardware sales, and publishing ventures, according to Bell Atlantic Chairman and Chief Executive Officer Thomas E. Bolger. Bell Atlantic Technical Ventures and Technology Concepts, Inc., both software firms, will be part of this new group.

Under the planned executive changes, the chief financial offi-

cer's position will be eliminated, and the duties of the office will be transferred to the new chief administrative officer, who will also manage Bell Atlantic's corporate development and strategic planning activities, among other things. The spokesman could not say whether Raymond Smith, now Bell Atlantic's chief financial officer, will be reassigned to another post.

Bolger said, in a statement to employees, "If we are to continue to grow and be successful, we must integrate our resources, sharpen our focus on the marketplace and continue to drive unnecessary costs out of the business."

The spokesman said 11 task forces have been assigned to spot duplication in the company so that it can be eliminated under the new structure. He said "any reductions in the work force will be accomplished through attrition. It is and continues to be our policy not to lay off staff."

Doane Perry, a senior analyst with Framingham, Mass.-based International Data Corp., noted that US West, Inc. recently underwent a similar reorganization. "I think the BOCs in general are trying to pull things together, after letting them fall too far apart," he commented.

"The strategy is to integrate the regulated and nonregulated operations as much as possible to strengthen both sides." □

3270

MICRO-MAINFRAME
Sync-Up™

3780

Emulation Software and Modem on One Board



DataSYNC 3270 and DataSync 3780 combine Winterhalter's DataTalker emulation software with the UDS Sync-Up modem boards (201C, 208A/B).

DataSYNC 3270

- Auto Dial/Auto Answer
- File Transfer
- 12 Sessions
- Application Program Interface (API)
- Hot Key
- \$1595 for 2400 bps (201C)

DataSYNC 3780

- Auto Dial/Auto Answer
- Application Program Interface (API)
- \$1095 for 2400 bps (201C)

If you want IBM 3270 or 3780 emulation on one low-cost, high performance communications board — call us today at 313/662-2002.

Also, ask about our 8 PC 3270 Cluster Controller for \$2395.



WINTERHALTER
INCORPORATED

3796 Plaza Drive • Ann Arbor, MI 48104

Sync-Up™ is a trademark of Universal Data Systems.

Application
Program
Interface

US Sprint posts big writedown

continued from page 2

the operation," Wilkes said. "It also probably signals an end to the blank check era at US Sprint. Their bottom-line orientation is not as strong as MCI's, which moved to control costs earlier." According to Wilkes, in 1986, US Sprint took in only about 75% of what it was owed. "I've never seen anything like that," he said.

In addition to Snedaker's appointment, US Sprint last week made two other senior management appointments. David Holland, president of US Sprint's Southwest division, and Robert Currey, senior vice-president of operations at United Telecommunications, were named executive vice-presidents.

Last month, Earl Lawson, vice-president and controller of GTE's new products division, was given the newly created title of vice-president of Finance and Management Information Systems at US Sprint. "You don't appoint someone to that position unless there

ON JULY 7, 1987, NORTHERN TELECOM QUIETLY CHANGED FOREVER THE WAY TELEPHONE NETWORKS ARE DESIGNED AND BUILT.

We introduced DMS-SuperNode*.

Now local and long distance phone companies can provide their customers with unique features and functions they could never before offer, including ones they can develop themselves.

DMS-SuperNode releases the power of networks already in place.

It's a powerful combination of DMS* circuit and packet switches, signal transfer points, service control points, cross-connects, and applications processors.

DMS-SuperNode opens networks for innovation.

It's fully compatible with the 1,500 DMS-100 digital systems already in service around the world. So each can evolve easily into a DMS-SuperNode supporting many new network applications at once. With new economies of scale.

DMS-SuperNode is the result of three important technological innovations:
DMS-Core, a high-performance computer that immediately doubles the processing power of DMS-100 systems, and by 1990 will increase it fivefold, to an almost incredible 1,500,000 call attempts an hour.

DMS-Bus, a transaction bus that connects the components of the node and incorporates modular increases in computing capacity.

DMS-Link, networking software that lets DMS-SuperNodes work with each other and with equipment from other companies.

Together, they open up the boundaries of traditional switching architectures and bring a new dimension to the network.

Best of all, DMS-SuperNode is more than a promising idea.

It's available now.

The first customer shipments have already begun.

And while it's true that advances of this magnitude don't occur every day, DMS-SuperNode exemplifies Northern Telecom's commitment to OPEN World* and open networks.

A quiet commitment to the Intelligent Universe*, where sharing information anywhere, anytime, and in any form will be as easy as using the phone today.



NETWORKING

Users flock to AT&T T-3

continued from page 1

bit/sec digital service delivered via fiber optics.

Although one T-3 circuit provides the equivalent of 28 1.54M bit/sec T-1 channels, T-3 services cost only as much as about nine T-1 circuits, as a rule of thumb, according to Todd Pierce, manager of teleprocessing systems at Carrollton, Texas-based Computer Language Research, Inc. Computer Language Research is one of the companies that was named in AT&T's filing.

The FCC filing reveals customer plans to install local-loop T-3 spans. Many of the users named intend to replace multiple local T-1 links with T-3 facilities to access Accunet T45 long-distance services. Other customers plan to employ T-3 trunks to access AT&T service nodes, from which other network services, including AT&T bulk calling services Megacom and Megacom 800, can be accessed. In both cases, AT&T leases the T-3 capacity from the local carrier and bills it to the user.

The filings also list the charges AT&T has agreed upon with each customer and the duration of each contract. AT&T does not have to file descriptions of long-distance T-3 contracts because long-distance portions have set tariffs, according to Robert Ellis, president of The Aries Group, Inc.

While many users intending to take advantage of T-3 have not actually implemented the service, a large Florida company in direct marketing and financial services told *Network World* it has been using two local T-3 spans for about a year. The company has cut calling costs by roughly 10% and boosted both the reliability and flexibility of

the 1,344 individual trunks, or call paths, supported by the two lines.

American Transtech, an independent subsidiary of AT&T, runs both voice and data over twin 45M bit/sec fiber-optic cables that directly link its headquarters in Jacksonville, Fla., to the nearest AT&T point of presence, 15 miles away. The two T-3 lines, leased from Southern Bell Telephone and Telegraph Co., give Transtech the access it needs to take advantage of Megacom and Megacom 800. "We can use it strictly because the volume of calls coming into and leaving Transtech is sometimes more than three million

While many users intending to take advantage of T-3 have not actually implemented the service, a large Florida company in direct marketing and financial services told *Network World* it has been using two local T-3 spans for about a year. The company has cut calling costs by roughly 10% and boosted the reliability and flexibility of 1,344 trunks, or call paths, supported by the two lines.

calls per month," according to Todd Stephenson, Transtech's telecommunications manager. "Because of that volume, it makes good sense to go with these DS-3s."

Prior to its T-3 cutover, Transtech used a series of T-1 spans to link its offices to AT&T for access to WATS and WATS 800 long-distance services. The T-1 lines were unreliable, according to Stephenson. "We constantly had service outages and other trunk problems," he explained.

In addition, reconfiguring trunks to add, delete or change trunk groups took 20 to 30 working days on average, he said. T-3 gave

Transtech added trunk management flexibility because the transmission pipes terminate directly at AT&T's 4ESS central office switch. Interval times for trunk modifications were drastically reduced: "We were able to go from month-long intervals down to eight days, and in emergencies, we can get things turned around the same day," he said.

According to Stephenson, performance and reliability of the two lines have been outstanding. "Since we've had the service, which has been more than a year, I have not experienced one trouble," he said. AT&T routinely tests the two lines to catch problems before they become noticeable, he said. "When

you have a pipe this size, there is automatic testing done by the AT&T office. Many times, I assume, they find troubles, turn the trunks down, put them back up, and we never know they were even out."

In terms of cost, the economies of scale are "substantial," Stephenson said. "We are realizing a minimum [cost reduction] of 10%. Actual savings depend on things like

time of day and call volumes. We probably are saving approximately 5 cents a [call-usage] minute, and in extreme cases, as much as 10 cents a [call-usage] minute," he said.

Another factor that influenced Transtech's migration to T-3 was the coming of Integrated Services Digital Network. At Transtech's premises, the T-3 spans are first demultiplexed by an AT&T Network Systems Group-supplied multiplexer into 1.54M bit/sec T-1 lines.

Those lines terminate in a recently purchased AT&T System 85 Release 2 Version 4 private branch exchange outfitted with ISDN Primary Rate Interface software. Stephenson declined to discuss the ISDN applications the company expects to use.

AT&T offers long-distance Accunet T45 services only where it has fiber-optic cable installed. The company's 10,000 to 15,000 miles of fiber currently stretch in three north-to-south lines and a set of east-to-west lines. The north-to-south lines run on the East and West coasts and from Chicago to Dallas. The east-to-west pieces tie Philadelphia to Chicago, Chicago to Denver and Denver to Los Angeles. ▀

Users await net 1-2-3

continued from page 1

on when it will be delivered. The spokeswoman would only say that the Networker will be shipped "this year."

Until the Networker becomes available, users can run 1-2-3 on a server. But, according to Robert Perry, Lotus' marketing manager for network products, they must provide a master diskette and documentation for each end user.

Several local network managers last week told *Network World* they have installed 1-2-3 on servers and modified the program's copy protection so individual users no longer require master diskettes. Although they knowingly violated the software licensing agreement by breaking the copy protection, the managers have been careful to purchase copies of 1-2-3 for all end users and store them away.

But modifying 1-2-3's copy protection only makes it easier for end users to work with 1-2-3 on a server. With or without copy protection, the current version of 1-2-3 does not run well in a network environment, users and analysts concede. The software lacks such multiuser features as file locking and will crash if two users try to access the same spreadsheet simultaneously, according to Andrew Seybold, chairman of The Seybold Group in Santa Clara, Calif.

Seybold added that 1-2-3 is just one of many single-user applications customers are struggling to use in a network environment. "There's a lot of frustration. People are trying to make these applications work as best they can," he said.

One East Coast data processing manager who recently installed a 400-node network complained about having to buy individual copies of 1-2-3 for network users. The manager, who asked not to be named, said she bought 400 copies of 1-2-3, locked most in a safe and modified several copies to run on the network servers.

Despite several requests for information on her part, the manager said, Lotus has refused to commit to a delivery date for Networker. "They don't want to be pinned down," she said.

Two other microcomputer managers admitted modifying code within 1-2-3 to disable the copy protection scheme in order to make it

easier to run the program on a network. "Lotus may say you're not supposed to do it, but if everybody has a copy anyway, they're not going to take anybody to court," one of the managers said.

Perry said, "We know people break the protection mechanism. But they generally buy software for all users." He said Lotus is not actively trying to discover which users are modifying the copy protection. "We are more concerned with people who are making illegal copies," he said.

Development of the Networker is winding to a close, according to Perry. Networker development has been difficult because the product has to operate on a variety of local networks, and the company insists on making it easy to install and use.

"We're not looking to write a network-specific application," Perry said. "We're looking at [Microsoft Corp.'s] MS-Networks and MS-DOS 3.1 as standards." Lotus is also working with Novell, Inc.

When it becomes available, the Networker will use a licensing scheme whereby a fixed number of users will be allowed to access the program concurrently, Perry said. Concurrent licensing will eliminate the need for key diskettes since the Networker will include a mechanism for controlling the number of users who access the program.

File locking will be included in the Networker, which will also be able to store information about each network user's hardware configuration, Perry said. This latter feature is desperately needed, according to David Ferris, chairman and chief executive officer of Ferrin Corp., a consulting firm headquartered in San Francisco.

1-2-3 allows users to specify a range of configuration information, including graphics and printer output and the directory the program should initially search to find spreadsheets, Ferris said.

The program expects to find this configuration information in certain local directories, which creates problems on a network. To get around the problem, "people are writing all sorts of weird batch files," he said.

"There's real frustration with Lotus," Ferris said. "Everybody needs a LAN version of 1-2-3. I can't think of a single client using Lotus that doesn't think it's a hassle." ▀

PRIVATE LINES

- REDUNDANCY & DIVERSITY FROM A SINGLE SOURCE
- NATIONAL COVERAGE AT AN APL PRICE

APL
THE DIRECT ALTERNATIVE

DIGITAL T-1
DS-0 to DS-1
VOICE/DATA/VIDEO
PRIVATE LINES

American Private Line Services, Inc.
140 Gould Street, Needham, MA 02194
(617) 455-9000
1-800-624-9203



Use the
attached form
to get your own
FREE subscription
to
Network World.

You can also use the form to make
any necessary changes to your name
and address.

INDUSTRY UPDATE

Telecom firms improve performance

Domestic telecommunications companies significantly improved their inventory management performance, and hence their competitiveness, in 1986, according to a study conducted by the management consulting firm Pittiglio, Rabin, Todd, and McGrath of Wellesley, Mass. With the help of just-in-time production, the industry showed a 1985 to 1986 increase of 23% in inventory turns, indicating that less money was spent per sales dollar generated.

► NATIONAL ASSOCIATION OF TELECOM DEALERS

NATD pushes support of used PBX equipment

BY PAM POWERS
Senior Editor

WASHINGTON, D.C. — Now halfway through its first year, the National Association of Telecommunications Dealers (NATD) may have scored a coup by convincing Rolm Corp. to support customers that have purchased used Rolm equipment through dealers.

Rolm officials declined to specify when a formal support program would be put in place but conceded that support of the secondary market is an "important issue" for the company. The still unofficial agreement comes almost a year after AT&T's decision to service refurbished AT&T equipment that its users purchase through secondary dealers, after years of refusing to do so ("PBX vendors mull used gear support," NW, June 1).

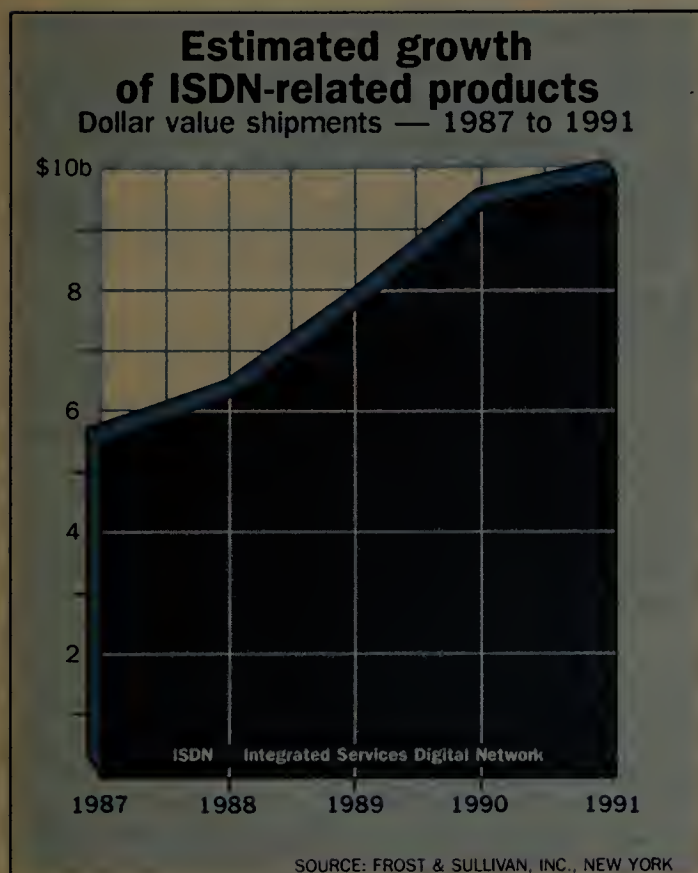
NATD has gained a lot of clout since it was formed eight months ago by the merging of two groups, the American Telecommunications

Dealers and National Telecommunications Dealers Association. While the former comprised primarily secondary computer dealers and the latter primarily interconnects, the two groups shared the common goal of improving sales of used communications equipment, according to Al Giles, chairman of NATD's board.

The combined entities have held two meetings since they banded together, and attendance at the most recent meeting, held two weeks ago in Florida, indicates that NATD is growing swiftly. Giles said the association now totals more than 70 member dealers.

Other representatives include some of the private branch exchange vendors to whom NATD is making its appeal for support of used equipment. "AT&T and IBM had top people at the conference, and Northern [Telecom, Inc.] was well-represented," said Avery Reynolds, vice-president of sales for Frontier Communications, Inc., a member company. "This is an im-

See page 10



► USER ASSOCIATION

AT&T, others join CCIA

BY PAM POWERS
Senior Editor

WASHINGTON, D.C. — The Computer and Communications Industry Association (CCIA), a 14-year-old trade group whose member companies generate more than \$80 billion in revenue annually, continues to expand in size and influence.

CCIA last week added AT&T and Masscomp to its roster of computer, software and peripheral vendors; maintenance and third-party service organizations; voice and data communications equipment companies; local and interexchange carriers; office automation vendors; and venture capital companies.

The group is both unique and influential because its membership includes a comprehensive group of high-technology industry companies. As a whole, according to spokesman Glenn Davidson, CCIA is able to accomplish more because it "works together for the benefit of the entire industry," unlike more niche-focused trade associations.

Perhaps more importantly, CCIA's individual members are predominantly chief executive officers and presidents — executives whose names carry a great deal of weight.

In addition to such concerns as international trade and national security, CCIA is heavily involved in telecommunications issues, Davidson said. The association reportedly conceived of the idea of forming the Corporation for Open Systems two years ago and remains active in promoting international standards and the development of Integrated Services Digital Networks.

As an advocacy group based here, CCIA has also lobbied for further deregulation of the telecommunications industry. Davidson said that

See page 10

INDUSTRY EYE PAM POWERS

AT&T searches for silver lining

AT&T recently projected improved earnings for its second fiscal quarter, but that still doesn't imply a sunny forecast for the years ahead.

In a Philadelphia meeting of securities analysts two weeks ago, AT&T Chief Financial Officer Robert M. Kavner said profits would be better than expected, due to the effects of cost-cutting measures taken over the last year. Kavner indicated that the second quarter earnings would show an improvement over the same quarter last year and would probably also be higher than first quarter 1987 earnings of \$445 million.

The earnings increase, Kavner admitted, will largely be the result of a depressed cost structure, rather than a growing revenue stream. Employment has dipped from 317,000 at year-end 1986 to 306,000 at the end of the first quarter, and an AT&T spokeswoman said that number will decline to 300,000 by year-end 1987. Additionally, the spokeswoman cited inventory controls and improved manufacturing processes as instrumental in the earnings increase.

It's commendable that AT&T has managed to stem a downward earnings trend with severe cost-cutting measures. What's a little alarming is that there still appears to be little relief on the revenue side, where the company has taken a beating.

Kavner reported stronger than expected performance in AT&T's long-distance business, where it still reaps most of its revenue. But rate of return regulations and competition in the long-distance market

have squeezed the carrier's rates by some 34% since divestiture. On July 1, another 4.8% price cut took effect.

Even if long-distance rate regulations are abolished, AT&T would presumably keep its rates low to remain competitive with the "cheaper" carriers. That doesn't allow much room for revenue growth, especially considering the fact that AT&T's share of the long-distance market has shrunk in comparison to its contenders' shares.

On the product side, rental revenue continues to decline at a precipitous 20% a year, according to AT&T officials. AT&T needs somehow to offset the decline from that side of the business, but clearly, the Information Systems Division, which sells AT&T's computer and data communications products, isn't going to handle that.

The company won't comment on earnings performance for its data and computer products, saying only that the division is "on target" for the year thus far.

But the computer business has been dogged by rumors of a spin-off lately, and it is general industry knowledge that it's not doing terribly well. The AT&T spokeswoman conceded that improvements in that division over the past quarter have come from the cost side, not the revenue side.

That leaves AT&T with a stronger internal structure due to a pared-down staff and lower operating costs, but with a nagging question — how will the company fuel revenue expansion?

No satisfactory answer has emerged yet. □

BRIEFS

Fujitsu America, Inc. appointed the first American to its board of directors as part of an effort to "increase the number of American nationals" managing Fujitsu's U.S. operations, the company said. Norman B. Petersen, who serves as president of Fujitsu's Computer Products Group, was elected to the 11-member board.

AT&T signed on **Almac Electronics Corp.**, based in Bellevue, Wash., to distribute some 75 AT&T voice and data communications products in the Northwest U.S. Among those products available immediately through Almac are AT&T's Lightwave short-haul data cable and the WE 321SB VMEbus single-board computer.

US Robotics, Inc. said it is seeking to establish a de facto standard for high-speed modems based on its Courier HST modem. The company is pursuing licensing and private-label agreements with modem manufacturers. It recently signed with Data Race, Inc. for resale of the Courier.

Mitel Datacom, Inc. said it will resell British Telecom modems through 12 manufacturers' representatives located throughout the U.S.

Bell South Enterprises, Inc. said it has reached a definitive agreement to acquire **Universal Communications Systems, Inc.**, which markets integrated voice and data telephone and information management systems, key systems and telecommunications management computers.

Votrax International, Inc., maker of automated attendant systems, voice store-and-forward sys-

tems, outbound dialing systems and data communications equipment, announced the completion of its merger with Vynet Corp., which markets similar products through value-added resellers.

Telebit Corp., maker of the high-speed TrailBlazer modem, raised \$4.5 million in financing, which the company said it will use to expand its domestic distribution channels and increase its presence in European markets.

California Micro Device Corp. (CMD) signed a memorandum of understanding with **GTE Communication Systems Corp.** for CMD to acquire GTE's microcircuits division in Tempe, Ariz.

The microcircuits division sells communications parts and equipment.

The planned acquisition will include the microcircuits division's assets, inventory, receivables, contracts and distribution channels, as well as the transfer of personnel to CMD.

Corvus Systems, Inc. announced a \$3 million agreement with Control Data Corp. under which Corvus will sell workstations and network servers to Control Data for remarketing during this coming year.

In an OEM marketing agreement with **Ridge Computers, Network Innovations Corp.** will make available Multiplex on Ridge 3200 RISC-based departmental superminicomputers that feature the RX/V operating system. Multiplex provides a link between IBM Personal Computer-compatible personal computers and relational data base management systems offered under the Ridge RX/V operating sys-

tem.

Under the agreement, Ridge will market a custom version of Network Innovations' Multiplex connectivity software to integrate MS-DOS personal computer applications such as the Lotus Development Corp. 1-2-3 and Ashton-Tate dBase Plus into relational data base systems available on Ridge Computers.

An unnamed international finance institution recently completed a \$3 million investment in the **Wollongong Group, Inc.** Proceeds from the investment will be used for acquisitions and general corporate purposes.

3Com Corp. combined its sales, marketing and customer service functions into a new division to reflect the company's shift from supplying individual networking components to offering work-group system solutions.

John Marman, 3Com's vice-president of sales and marketing, was promoted to senior vice-president of the new sales, marketing and service division.

Jerry Dusa was appointed vice-president of North American field operations.

Intecom, Inc. said **Touro Infirmary** of New Orleans contracted with **South Central Bell Advanced Systems** for an integrated business exchange, the IBX S/10 voice and data communications system.

The 1,600-line IBX system will provide voice communications and data access to the hospital's office automation system. Both VT220s and IBM Personal Computers will link into the IBX through modular data devices, the Asynchronous Data Interface (ADI).

Applitek Corp. was awarded a \$25 million contract by **Systemhouse, Inc.** for the provision of a UniLAN communications network to be implemented by the U.S. Army's Defense Standard Ammunition Computer System (DSACS).

The contract calls for the delivery of asynchronous terminal/Personal Computer servers and IBM 327X terminal servers with connectivity to IBM, Sperry Corp., Digital Equipment Corp. and Prime Computer, Inc. hosts through gateways. □

NATD pushes support of PBX

continued from page 9

portant issue for the vendors."

The issue is important to the vendors because it is important to their users, Giles said. "It's the users that are convincing the vendors to support the secondary market," he claimed. "That's because PBX add-on equipment and upgrades are purchased at less cost and installed more quickly through secondary dealers than through the manufacturer."

Louise Dunne, product manager for International Data Corp.'s Leasing Planning Service, commented, "It's in the vendor's best interest to support the secondary market."

"AT&T wants the customer to buy its own used equipment, not someone else's," she said, and users demand manufacturer support of their equipment, regardless of where they purchased the gear.

Support of the secondary market creates another benefit for the vendor, Dunne explained.

The residual value of used equipment increases with vendor support because vendor-backed switches are more attractive to users. Since AT&T has committed to supporting its refurbished equipment, Dunne said the residual val-

ues of its PBXs have increased.

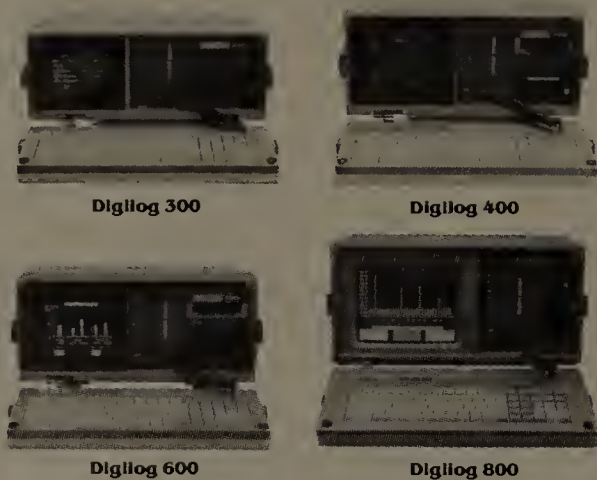
At least one Rolm user, who asked not to be identified, said he hopes Rolm will adopt a formal program of support.

"I want used equipment to be an alternative for me, that's all. That doesn't mean I'll buy only used Rolm equipment from now on, which is what I think they're afraid of," he said, alluding to the fact that new equipment sales bring in more income for Rolm than used equipment sales do.

"In fact," he said, "it would give me the option to buy Rolm equipment where I now cannot because they won't support it if it's used."

Despite the apparent ground swell for vendor support, Rolm and other vendors such as Northern Telecom and Mitel, Inc. have dragged their feet in rallying behind the secondary market. A Rolm spokeswoman said last week that the company is "in the process of putting together a formal program, which we hope to introduce fairly shortly."

Both Giles and Dunne remain optimistic, saying they would be surprised if other vendors don't make moves soon to adopt secondary market programs. □



We've got your number
One of these four protocol analyzers
is just right for you

Each model offers you a distinct solution. Yet, as a family, they are all compatible . . . software, disk, remote control, and operationally.

In a national survey of data comm professionals, 53% named these Digilog analyzers as their ideal.

Digilog analyzers are ideal for field service, network diagnostics and test, software development, and network optimization and planning.

3-YEAR WARRANTY
Call toll free
800-233-3151
In PA, 215-628-4530

DIGILOG®

Leading in Data Communications Test and Control

AT&T, others join CCIA

continued from page 9

while the association is mindful of anticompetitive concerns, it has pushed for the abolition of AT&T's rate-of-return regulations on AT&T and has fought for the freedom of the Bell operating companies to enter information services, long distance and manufacturing.

However, Davidson said, CCIA believes the BOCs should be prohibited from manufacturing their own central office switches and should be allowed to provide long distance only over other carriers' facilities.

Provided those restrictions are put in place, the CCIA "welcomes the additional competition the BOCs would bring" to the market, Davidson said. □

TELECOM TRENDS

“Telephones and computers, who can tell them apart? And what's more, who would want to?”

Delbert Staley
Chairman and chief executive officer
Nynex Corp.

USERS GROUPS

T-1 group flounders

Many express interest, but help still hard to come by.

BY BOB WALLACE
Senior Editor

NEW YORK — Despite several setbacks, Al Weresow is still searching for a few good users to help construct the communications industry's first independent T-1 users group.

Weresow, corporate telecommunications manager for Sterling Drug, Inc., has spent almost 18 months laying the foundation for the users group. Numerous T-1 users have expressed interest in joining such a group, but precious few have come forth to help create the association.

“This project is just too large for one person,” Weresow said. “I have not given up hope, but the project is moving along very slowly. I'm having a tough time drumming up five or six users to help create the steering committee.”

Weresow said he advocates vendor-independence, meaning companies using T-1 transmission facilities from any carrier can become members.

See page 12

The saga of the independent T-1 users group



Chapter 1 Summer/Fall 1985

Sterling Drug, Inc.'s Communications Manager Al Weresow decides to create an independent T-1 users group.

Chapter 2 Spring 1986

Interested users assemble at the International Communications Association conference in Atlanta.



Chapter 3 Summer 1986

AT&T decides to found its own T-1 users group.

First AT&T T-1 users group meeting convenes.



Chapter 4 Winter 1986

Snowstorm buries New York on eve of inaugural independent T-1 users group meeting. Two users attend.

Chapter 5 Summer 1987

Sterling Drug's Weresow still seeks a handful of users to found independent association.



SOURCE: STERLING DRUG, NEW YORK

PBX DEAL

Ericsson wins big at State U.

Low bid pays off in college contract.

BY BOB WALLACE
Senior Editor

STILLWATER, Okla. — By underbidding eight competitors, including industry giants AT&T, Tel Plus Communications, Inc. and Southwestern Bell Telecommunications Co., Ericsson recently landed a contract to provide Oklahoma State University (OSU) with a \$6.1 million private voice, data and video network.

The victory is an example of the aggressive push Ericsson, a late entrant into the U.S. private branch exchange race, is making to try to wrest contracts from veteran private net providers.

Ericsson was awarded the bid despite a last-minute proposal by Southwestern Bell, which tried to avert the loss of this large analog Centrex service account. The university said the Ericsson-provided network, which will initially serve 7,215 telephone stations, will cost \$10 million less than if the school had continued to use the Bell operating company's Centrex service for the next decade.

The central processor of an Ericsson MD-110 PBX will act as the network hub and will serve seven smaller sites, each equipped with MD-110 Line Interface Modules (LIM). The LIMs will be tied to the hub via fiber-optic cable in a star configuration. The project also calls for the installation of a coaxial-cable-based system, which will be used with the fiber cable to support video communications between a central studio and more than 40 university buildings.

OSU shrugged off the BOC bid because the school wished to own and operate its own communications net. Don Sheppard, physical plant and operations director for the university, said OSU sought an on-campus PBX-based net over a central office-provided Centrex solution. “Analog Centrex service is a 15-year-old technology,” he said. “Continued use of this service would not meet our distributed processing requirements.”

The Ericsson network will initially serve the university's telecommunications requirements and will later enable students housed

See page 13

CROSS TALK BOB WALLACE

Reaping the bonanzas of bargain hunting

When users looking for bargains meet up with bargaining vendors, the by-product can be free or cut-rate communications service or equipment.

Aiming to force open the door to the Canadian private branch exchange market, Intecom recently agreed to provide Laval University with an electronic mail system, capable of supporting as many as 500 users, free of charge for one year.

Several prominent PBX vendors responded to the university's PBX request for proposal, but the E-mail system Intecom offered clinched the deal, the user claimed.

Industry watchers maintain that vendors offer extras to sweeten the pot when network bids are very similar. It is typically up to the communications manager to initiate the dialogue.

Users can also receive bargains and other possibly intangible benefits by agreeing to beta test new products and services. Besides potentially land-

ing a bargain, beta-test customers acquire first-hand experience with emerging technologies.

But some vendors go too far in attempting to persuade users to purchase their products and/or services. According to Assistant U.S. Attorney Lantz Lewis,

Users can also receive bargains by agreeing to beta test new products and services. Beta-test customers also acquire first-hand experience with emerging technologies.

prosecutor in a San Diego County network scandal case, top county officials were bribed and provided with prostitutes in an effort to get them to award a telecommunications contract to Telink, an Anaheim, Calif.-based telecommunications vendor (“Net scandal trial opens,” NW, March 30).

More traditional bargaining chips are almost always available from long-haul carriers. Deals include waiving installation fees for certain voice services — a favorite program of ITT Corp.'s United States Transmission Systems, Inc. long-distance unit — and “pay for one, get the rest installed free” programs, part of US Sprint Communications Co.'s marketing repertoire. These and other carriers also provide sundry other limited time offers on their communications services.

Some of the start-up carriers, when pushed, have even been known to install microwave bypass systems to link customers directly to their network points of presence.

Although the telecommunications services and equipment industry has not become a Turkish bazaar, the savvy communications manager may be able to get more bang for the buck simply by keeping options open. □

TELECOM TIDBITS

Centigram Corp. of San Jose, Calif., recently unveiled a software package that permits its voice messaging system to work in conjunction with Centrex, a telephone switching service provided by the regional Bell operating companies to business customers.

The voice mail system, VoiceMemo, answers calls, stores messages and notifies users of pending messages.

Together, the VoiceMemo system integrated with Centrex features call forwarding to a personal mailbox within the voice mail system and notification of unplayed voice messages by the telephone system. Call identification and return to operator are also available.

The call forward feature allows callers to be forwarded to a personal mailbox when they encounter a busy signal or when the call is not answered. The message notification feature informs called parties that they have a pending message. This is indicated by a stutter dial tone.

Caller identification allows automatic mailbox identification, and the return-to-operator feature lets callers return to a live operator after they have left a message.

ITT Chernow Communications, Inc. recently introduced operator-assisted calling service for its lodging industry customers.

Customers for ITT Hotelnet long-distance services and equipment can directly dial intrastate, interstate and international calls carried by ITT. Customers can also dial "0+" to use the new service. Operator-assisted calling handles collect calls, regular calls, credit card calls, third-party billing and person-to-person and international calls.

Microtel, Inc. recently introduced a full line of Florida 800 services designed to accommodate business users of all sizes.

The 800 services allow customers to place outbound calls and receive incoming 800 calls on the same telephone line. Before Microtel introduced these services, AT&T was the only provider of these services to the business community.

Microtel's full line includes a LaserPLUS 800 service designed for small businesses that do not have enough incoming telephone calls to justify the cost of using AT&T's 800 WATS lines but could benefit from having an 800 number.

In addition, a Laser WATS 800 service, which is designed for medium-sized businesses with inbound telephone usage exceeding \$300 per month, is now available.

The Laser EXPRESS 800 service is designed for larger businesses with inbound telephone call volumes exceeding \$1,500 each month.

In a July 2 filing with the Federal Communications Commission, **AT&T** proposed offering AT&T International 800 Service to Japan

and Panama. AT&T asked that this offering become commercially available Aug. 16.

If approved, those using the service from Japan would pay \$117 per hour for the first 10 hours, \$11 for the next 25 hours and \$105 per hour for more than 35 hours. For toll-free calling from Panama to the U.S., callers would pay \$87 for the first 10 hours, \$81 for the next 25 and \$75 for more than 35 hours.

Introduced in 1984, AT&T International 800 Service is currently available in the UK, Canada, Italy, West Germany, Denmark, France, Korea, the Netherlands and several other countries. □

T-1 group flounders

continued from page 11

This would enable users to compare T-1 vendors in terms of service and support, as well as to discuss applications.

Vendor presentations welcome

Service providers such as AT&T, MCI Communications Corp. and US Sprint Communications Co., along with multiplexer vendors Network Equipment Technologies, Inc., Timeplex, Inc. and others, would be invited to deliver presentations to users but would not be actual members of the group.

So far in '87, finding committed users to join Sterling has been

tough sledding. The ascendancy of AT&T's T-1 Users Group, which held its inaugural meeting in June 1986, may also have affected user interest in Weresow's group. "There is some reluctance on the part of AT&T T-1 Users Group members to participate in a second T-1 user association," he admitted.

Weresow said he believes AT&T's T-1 Users Group provides a limited amount of useful information. "AT&T's T-1 Users Group meeting is a sales job. They are selling the service," Weresow claimed. "There are no opportunities to share war stories with other users."

AT&T would not provide an agenda for the group's May meeting in Florida.



BUILDING THE NEW LONDON BRIDGE.

However, Victoria Wright, Accunet T1.5 service marketing manager, challenged Weresow's view of user interaction at the AT&T T-1 meets. "The users had four hours over two days at the last meeting to get together without AT&T present," she said.

AT&T provided tutorials on synchronization and Customer Controlled Reconfiguration and participated in panel discussions on service features, she added.

The AT&T T-1 Users Group, which boasts 60 member companies, has a six-member steering committee consisting of three AT&T representatives and three customers.

The vendor would not divulge the identity of the users. A change

in this group's member criteria may have contributed to Weresow's membership woes. Wright said that originally customers had to spend a specified amount of money on AT&T T-1 service as a prerequisite to membership. She would not say what the amount was. Sometime later, AT&T relaxed the original requirement to allow any Accunet T1.5 user to join the users group.

Tough going

Attempting to assemble a users group has been a long and arduous task for Weresow (T-1 users knock lackluster service," *NW*, Sept. 1, 1986). User firms interested in Weresow's product assembled at the International Communications

Association conference in May 1986.

Five users, including two New York-based firms, Pfizer, Inc. and Ciba-Geigy Corp., volunteered to help build the users group. But, the day before the group of five users was due to hold its meeting, the city was hit with a major snowstorm.

Weresow credited Sterling Drug, a \$1.99 billion pharmaceuticals manufacturer that makes such products as Bayer aspirin, with supporting his efforts to build a users group.

Sterling allowed Weresow to take on this burden in addition to his day-to-day administration of the firm's voice and data communications networks. **Z**

Ericsson wins big

continued from page 11

on campus to access the school's computer using personal computers. The network will also be used to interconnect numerous local networks scattered across the campus here.

The recommendations of a communications consulting firm, ongoing dialogue with other academic institutions and a visit to a large Ericsson installation helped OSU evaluate the strengths and weaknesses of the MD-110 Intelligent Network, according to Sheppard.

HCI & Associates, a Columbus, Ohio-based consulting group, rated the different vendors' proposals in order to determine which system best met the school's requirements as delineated in the request for proposal. HCI will also oversee the cutover of the Ericsson system.

OSU also enlisted the aid of Telecommunications International, Inc., a Denver-based consulting concern, which concluded owning a private network would be less expensive than leasing network services.

OSU hopes to reduce the expense of moving, adding and changing individual telephone stations. Sheppard estimated OSU pays the BOC between \$40 and \$50 per station for this work.

Sheppard said his discussions with peers at other colleges and universities helped provide OSU with knowledge of private networking triumphs and tragedies. "There is a very strong network of sophisticated communications users in the higher education field," he said. "There are a number of users that are willing to share information and insights."

Sheppard and company visited one such user, the University of California at San Diego, which had already selected Ericsson to install a private network.

"They shared the good and the bad with us, just as we will be willing to do with other users when our network is operational."

Sheppard said a committee comprising representatives from a handful of OSU departments also provided valuable input about end-user communications requirements.

"We had comment from our data-processing, telecommunications and residential life departments," he said.

"This committee made certain we were aware of the diverse communications needs of its constituents. It's impossible for any one group to know the needs of the entire university."

The efforts of the consulting firm and the committee and assistance of other users complemented work done by those at OSU, who, Sheppard said, thoroughly researched Ericsson, its PBX technology and other users.

OSU will finance the purchase of its network by selling revenue bonds. Savings from the use of the private network will be used to pay for the bonds over a period of 10 years, Sheppard noted. **Z**



When Mercury Communications, Ltd. needed a short haul solution to service greater London, they called Digital Microwave. Our 23GHz microwave radios and fiber optic systems gave Mercury the answers that they needed.

Using high performance radios and fiber optic terminals we linked Mercury's

customers to its long distance network.

Working together, we built a new bridge over London. But this one spans considerably more than the Thames. It already includes more than 1,000 digital radios and over 700 fiber optic terminals.

And what we do for eight million Londoners, we can do for you. Whether

you need to link 8 or 800 people.

In addition to our 23GHz narrow and wide band, we offer 13GHz and 18GHz digital microwave radios that operate up to a DS-3 (45 Mb/s), and fiber optic systems that operate from 1.544 (T1) to 45 Mb/s (T3). Plus powerful repeaters, channel banks—everything, in fact, for a complete custom tailored short haul network.

All our products are available in both U.S. and CEPT digital formats and line rates.

So remember the new London Bridge and call (800) DMC-WAVE. And for once you can cross your bridge before you come to it.

**Digital
Microwave**
HOW TO MAKE ENDS MEET

170 Rose Orchard Way, San Jose, CA 95134
(408) 943-0777 Telex: 759597

Now Network World puts the power of over 800 on-line databases at your fingertips.

If you need instant access to news and information about your competition, your profession, technology, finance, law, or just about any other subject, Network World's SearchLink will give it to you.

SearchLink is easy to use and inexpensive.

All you need is a credit card and a computer with modem.

No subscriptions. No passwords. No difficult manuals to learn. Just call 800-843-7337 with your computer and log on. You pay only \$7.99 per search (a few databases carry surcharges) plus 25 cents per minute for telecommunications and \$2 for each abstract you want to see. (You can also get hard copies.) You can charge everything to MasterCard, VISA, or American Express.

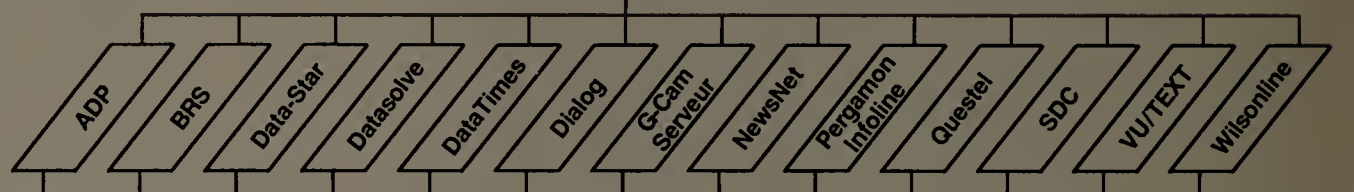


SearchLink provides 24-hour on-line assistance.

SearchLink even gives you free on-line tips from trained SearchLink search specialists if you have problems or questions about your searching. Just type "SOS" when you're on-line!

SearchLink gets you to the information you want.

If you've ever wanted to access databases offered by BRS, Dialog, or NewsNet, among others,



ABI/INFORM • Business Software Database • Chemical Abstracts • COMPENDEX® • Disclosure • Computer Database • Donnelley Demographics • COMPUTERPAT • Dun & Bradstreet • INSPEC • ERIC • Menu-The International Software Database • PTS PROMT • Microcomputer Index • Standard and Poor's Corporate Descriptions • Online Microcomputer Software • Trademarkscan • SUPERTECH • TRINET • Biological & Agricultural Index • German Business Scope • Combined Health Information • Gray's Anatomy • Excerpta Medica • Pharmaceutical News Index • Medline • Index to Legal Periodicals • Laborlaw • Legal Resource Index • Associated Press • PR Newswire • UPI News • Reuter News Reports • Communications Daily • FCC Daily Digest • Fiber/Optics News • International Communications Week • Investext Databases • Wall Street Monitor: Weekly Market Digest • American Petroleum Institute • Bond Buyer • World Business Intelligence Daily • Insurance Abstracts • International Dun's Market Identifiers • Financial Times • Japan Weekly Monitor • Washington Post • New York Times • Los Angeles Times • San Francisco Chronicle • D&B

SearchLink will access databases from all of them—without any special subscriptions or knowledge of special search languages.

Call 800-843-7337 with your computer now!

Put the power of knowledge to work for you right now. Call 800-843-7337 (THE SEER) on your computer and get the answers you need to stay ahead.

- ☐ Please send me "A User's Guide to SearchLink" —FREE!
☐ Please send me a list of databases available through SearchLink.

Name _____

Title _____

Company _____

Co. address _____

City _____ State _____ Zip _____

Phone _____

Mail to: SearchLink, Box 9171, Framingham, MA 01701-9171

NW

SEARCHLINK

NETWORK WORLD

A CWCI Publication
An International Data Group Company

Your link to the world of information
An International Data Group Service

SearchLink is sponsored by the National Federation of Abstracting and Information Services. NFAIS is a professional association of database producers.

SearchLink is an electronic gateway service co-developed by CW Communications/Inc. (CWCI) and Telebase Systems that provides the unique ability to easily access a wide variety of databases from numerous database vendors without passwords, subscriptions or knowledge of complex search languages. The database vendors that SearchLink accesses are not affiliated with CWCI and operate as separate business entities independent of CWCI. While a vast amount of valuable data from these vendors is accessible through SearchLink's state-of-the-art technology, neither CWCI, nor Telebase, warrant the reliability or accuracy of the database vendors' data and SearchLink's operation should not be misconstrued as an endorsement of any database or its content.

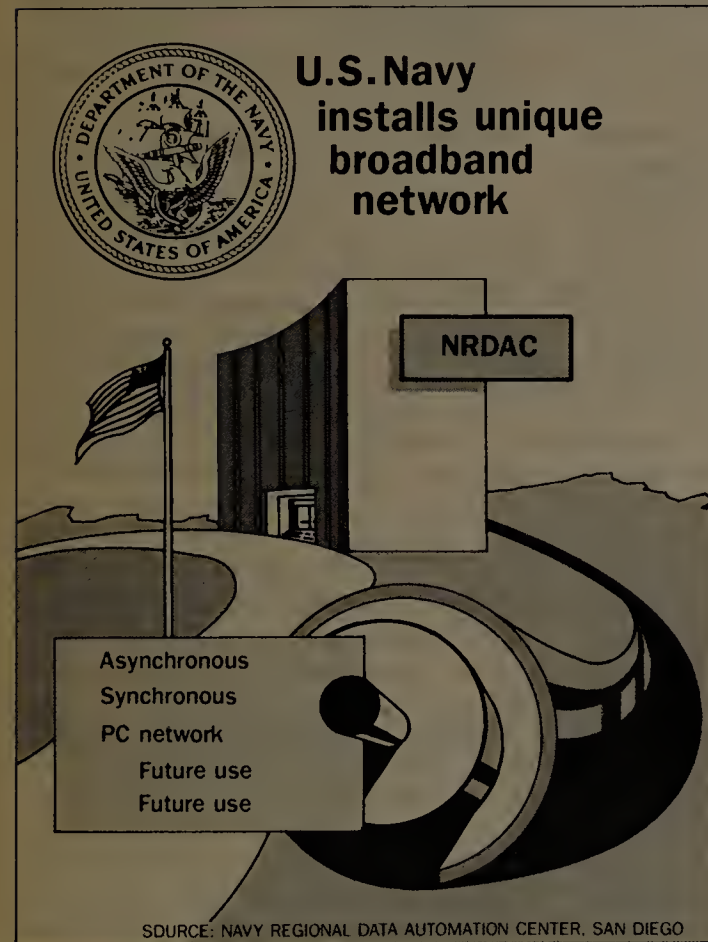
To connect to SearchLink: set your computer/modem as follows: 8 bit "word" size; 1 stop bit; "none" parity; full duplex; 300 or 1,200 baud speed; no line feed on carriage return; X ON/X OFF supported. For more information about SearchLink BY VOICE, dial 617-879-0700.

DATA DELIVERY/ NET MANAGEMENT

► BROADBAND NETWORKS

Navy beats net snafus

Consultant aids revamp of multivendor data center.



BY PAUL KORZENIOWSKI
Senior Editor

SAN DIEGO — Later this month, the U.S. Navy will move one of its eight Naval data centers into a new building here that was designed from the ground up with data networking requirements in mind.

In designing the broadband network to be installed in the \$15.7 million Grace Murray Hopper Service Center, the staff of the Navy Regional Data Automation Center (NRDAC) had to solve a multitude of problems, including network management problems that left most vendors scratching their heads.

NRDAC offers time-sharing and consulting services to a variety of military users on the West Coast as far north as Alaska. The service center's 290 employees include both naval and civilian personnel, who ensure that the services are available 24 hours a day.

The bureau operates like a private company and charges customers for the services, which are supported by a variety of processors, including Burroughs Corp. and Sperry Corp. mainframes, and minicomputers from Perkin-Elmer Corp. and Hewlett-Packard Co.

The broadband network was chosen because

MAP directory out

Looking for communications equipment that conforms to the Manufacturing Automation Protocol/Technical and Office Protocol? The Society of Manufacturing Engineers (SME) recently published a "MAP/TOP Product Directory," which lists 179 products from 57 vendors that conform to the communications protocols. The directory is available for \$135 from the SME in Dearborn, Mich., at (313) 271-1500.

its capacity could be segmented into bands to accommodate the various needs of the center, including support of asynchronous, synchronous and personal computer traffic over a single cable.

But the network posed one major problem. The service bureau found tools to monitor performance on the asynchronous band and on the personal computer file server band but could not locate any to check the synchronous band.

"Most broadband network management tools monitor only one vendor's proprietary protocols," according to Dan Zatyko, president of Zatyko Associates, a Tustin, Calif., consulting firm that worked on the network design. "Broadband network management tools were not designed for multivendor environments."

Vendors said the problem was unsolvable, but Larry Roberts, supervisor/computer specialist at NRDAC, devised a solution. He recommended installing a network monitoring system that examined synchronous digital data before it was put on the analog network. A performance monitoring unit from Avant-Garde Computing, Inc. was chosen to perform that function.

Network management was one of many problems NRDAC faced when it began designing its new building in 1981. The service center was housed in a building in the North Island Naval Air Station, constructed during World War II. Its thick concrete walls were designed to withstand an air raid but could not easily support the center's rapidly changing data processing requirements. Running wire and cable through

See page 16

► ELECTRONIC MAIL

Study says E-mail market to prosper

Vendors start to turn corner.

BY JOY KALFOPULOS
Network World Staff

PALO ALTO, Calif. — The market for electronic mail is expected to demonstrate healthy growth during the next few years, according to a study released here earlier this year by the Market Intelligence Research Co.

E-mail is the transmission of text, chart or graphic messages from one person to another. A variety of devices, such as Telex systems, facsimile machines, word processors and computers can support an E-mail application, and messages can be transmitted over coaxial cable, telephone lines or satellite links.

The study — entitled "Vertical Markets for Electronic Mail: Evolving to New Opportunities" — describes the market's competitive environment as expensive to enter, with financial backup necessary to help a vendor survive during its first years of existence.

Vendors have been struggling for several years, but recently, they seem to have turned the corner, according to the report.

The market research company estimated that one million electronic mailboxes are currently in use, and it predicted the E-mail business will become a multibillion dollar industry by 1992, with revenues reaching \$1.9 billion.

Speed, cost and flexibility are among the advantages of E-mail, according to the report. The speed stems from the application's instant delivery of a message, and because

See page 16

DATA DIALOGUE

JEFFREY HELD

Evaluating net design tools

Many large companies are turning to network modeling to design their corporate networks. These tools enable users to build a replica of their network that they can use to gauge the effect of network design changes. Companies can calculate, for example, the impact of adding more cluster controllers to a multidrop line or replacing 9.6K bit/sec lines with 56K bit/sec facilities.

A network modeling tool typically is a major investment. The more sophisticated products can cost more than \$100,000 for a mainframe-based product, or \$50,000 to \$100,000 per year for time-sharing modeling tools.

Modeling packages also require users to commit to entering network traffic and configuration data, a major undertaking — especially for users with thousands of terminals.

Before making such a commitment, users should examine the features and functions of the modeling system. Ideally, the system should allow the user to control the costs of an existing net-

work, expand existing networks in an economical manner and quickly gauge how new functions will affect the network.

The model should be able to perform three basic functions: cost analysis, performance analysis and topology optimization. Most packages currently on the market perform these functions, although it is also possible to purchase packages that perform a subset of these functions.

Cost analysis requires a flexible and current data base of tariffs and prices. These data bases usually contain the major interstate carriers' tariff filings for various leased and switched service offerings.

Some vendors are adding to this basic service and are beginning to offer intrastate tariffs and options for terminating circuits. Intrastate tariffs are a source of headaches for developers of models because they are constantly changing and affect only one state at a time. Most firms that offer tariff data bases have contracts with the major intrastate carrier to provide up-to-date tariff filings as they occur.

Even so, tracking the tariff filings and

See page 16

Held is group manager at Network Strategies, Inc., a Fairfax, Va., consulting firm.

Navy beats net snafus

continued from page 15

the building was often a difficult and time-consuming task, according to Fred Hahn, senior telecommunications planner at the service center.

Local networks were just emerging when the Navy decided to move NRDAC into a new building, so the center began evaluating how to incorporate the technology into the building's design. "At first, we wanted to install an integrated voice, data and alarming network," Hahn said.

The Navy hired a consultant to determine which capabilities the network could support and how it should be designed. "We wanted a consultant with no vendor ties to design the network and write the request for proposals," Hahn said.

The first consultant hired was not qualified for the job. "The consultant was very familiar with PBXs but knew little about networks," Hahn said. Time passed as the Navy attempted to prove the person was not qualified, and the building completion date slipped from the summer of 1985 to the summer of 1987.

A consultant agrees

In 1985, a second consulting firm, Zatyko Associates, was retained. After a complete evaluation of NRDAC's networking requirements, the firm recommended a broadband network, a decision the Navy had independently arrived at in 1981.

The network would be divided into five 6M bit/sec bands, three of which were designed to support one type of user equipment. The first band was designed to support synchronous traffic to Burroughs and Sperry hosts; the second supported asynchronous minicomputer traffic, and the third acted as a

microcomputer local network.

Two additional 6M bit/sec bands were available for future applications, such as video or voice. The broadband approach would enable users to move easily from one type of application to another. For example, a network-supported protocol converter would enable a microcomputer to emulate a Burroughs terminal and give users access to mainframe data.

Advantages of broadband

The broadband approach also gave NRDAC network flexibility. "We can vary the network workload by changing modem frequencies, a capability not found in a token-passing or Ethernet network," Roberts noted. "In our environment, we have some real peaks and valleys, and we need that type of flexibility."

As the networking specifications were added to the building design in 1985, NRDAC faced another hurdle. Since the building contractor was unfamiliar with broadband networks, he passed the work on to an electrical subcontractor. He, too, was mystified by the project and turned the work over to a cable TV installer, who then handed the job over to TRW, Inc.

Despite the delays and snafus, commanding officer Capt. Charles Smith is proud of NRDAC's input on the building design, which will be fully occupied by the end of this month. He said the new building is the first Naval facility to include networking capabilities in the initial design. "Other Naval facilities may follow our lead," he said.

"Technically, the military is often seen as following the commercial sector," Smith said. "In this case, we have designed a leading-edge network and solved problems, such as the network management issue, that even the vendors couldn't solve." □

Evaluating net design tools

continued from page 15

changes in all 50 states is a nightmare.

Compounding the problem are leased-line service options and bridging arrangements. Different bridging arrangements, which allow the user to select bridging of multidrop circuits in a long-haul or intrastate carrier's central office, can result in significant differences in circuit cost.

The cost analysis part of a modeling package should enable the user to try different tariffs, or even to invent his own. This function is vital to allow users to explore the consequences of changing services or carriers. User entry of tariff data is also important because customers may be negotiating discounted or contract options. In addition, the tool should enable the user to change the carrier or service on any portion of a network.

The second item, performance analysis, enables users to estimate the response time or throughput of their networks. It is important to note that the models only provide estimates, which may vary from actual results.

Also, even the most sophisticated models cannot precisely predict the performance of networks that use a variety of vendor equipment. The tools are limited to performance information on only one manufacturer. IBM's SNAP/SHOT, for example, simulates the performance of only IBM equipment.

Another important distinction is the difference between analytic and simulation modeling tools. Analytic tools use mathematical formulas, usually based on queueing theory, that approximate the response of different protocols and networks. Simulation models, on the other hand, mimic the actions of a particular protocol or equipment type within the program and thus more precisely model a specific piece of equipment.

Analytic models typically execute very quickly, give reasonably

accurate results in most cases, and are most suited to personal computer implementations. Simulation models consume a lot of computer cycles and thus are used on mainframes and minicomputers. In many cases, analytic and simulation tools will yield identical results. In other cases where mixed batch and interactive network traffic is being examined, simulation models yield more effective results.

The last step in most modeling procedures is the optimal layout of the network. Most modeling packages perform this task by interactively trying various topology combinations until they obtain one that shows the lowest cost.

Most modeling packages have the ability to optimize three types of networks: multidrop circuits, concentrator networks and packet networks. The optimization algorithms used by various vendors are typically closely guarded secrets, since the results ultimately determine the cost or savings for the networks.

Optimization is another very processor-intensive process, and vendors are always searching for more efficient algorithms. Optimization algorithms usually attempt to minimize cost for a particular type of network given a performance constraint.

A typical case would be a multidrop terminal network, in which a user wishes to maintain a three-second response time. The optimizer program would attempt to lay out the least costly multidrop network satisfying this requirement.

The user typically has to specify the type of network, the carrier or transmission facilities, traffic statistics and the basic characteristics of the terminals, hosts, communications processor and protocols.

Next week we will continue this examination of what users should consider when purchasing such tools. □

In many cases, analytic and simulation tools will yield identical results. In other cases, simulation models yield more effective results.

Hacker-Proof Your Data

Concerned about Security? Want to protect your data files from unauthorized access?

Anderson Jacobson 1200 and 2400 bps security modems stop hackers at the modem — before they can get to your computer. Security — including Callback and Answerback — is handled entirely by the modem. Your data files are secure because potential intruders can't enter your system. At your end, 2 levels of password security protect your modem configuration and telephone directory from prying eyes and unauthorized changes. No one can use the modem, dial a number, or change option settings unless they know the password.

Anderson Jacobson offers a choice of "AT" compatible security modems: ■ **AJ 1212/2412-AD3H** — 1200 and 2400 bps stand-alone modems with Callback, Answerback, and Passwords ■ **AJ 2441** — 2400 bps stand-alone or central site rackmount modem with Callback, Answerback, Passwords, and optional MNP level 4. ■ **AJ 2412-STH** — low cost 2400 bps stand-alone modem with Answerback and optional MNP level 4 — excellent choice for a remote site companion modem. These hacker-proof modems are quality engineered from AJ — just a few of the wide range of products from Anderson Jacobson with 20 years of experience in data communications.



Ask for Dept. NW-713
Anderson Jacobson, Inc.
521 Charcot Avenue
San Jose, CA 95131
CA (408) 435-8520
U.S. (800) 423-6035
Canada (800) 387-9645

E-mail market to prosper

continued from page 15

users can send and receive messages at any time, the application is flexible.

Further, as new applications are developed, the cost of E-mail systems will decline and become competitive even with traditional services, the report explained.

The study said E-mail accessory software is a growing market segment of the business. The software is used as a tool to access an E-mail system through a microcomputer.

E-mail is being used for special applications such as shipping time-sensitive messages and business transactions such as purchase or-

ders, shipping and receiving materials, invoices and product announcements, the study reported.

E-mail market strategies, vendor profiles, industry issues and business and consumer requirements are also covered by the report.

The study examines electronic messaging, which includes computer-based messaging service and Telex/TWX; electronic data interchange; and image communications. Each segment includes market forecasts, software and equipment, and vertical market analysis.

"Vertical Markets for Electronic Mail: Evolving to New Opportunities" is available for \$995 from Market Intelligence Research Co., 4000 Middlefield Road, Palo Alto, Calif. 94303. □

LOCAL NETWORKING

NETWORK TRENDS

Users cite key LAN applications

File, data base sharing top list of uses.

BY PAULA MUSICH
Senior Editor

MARLBOROUGH, Mass. — The No. 1 reason for installing a local network, according to a recently released survey of large corporations, is to provide end users with access to shared data bases and files.

The Market Information Center, Inc., based here, polled communications professionals at 292 companies with an average of 95 employees. The professionals, asked to rank the importance of six net-

work applications in justifying the installation of a local network, also cited device sharing, providing users with access to other facilities and sharing various types of software on a network.

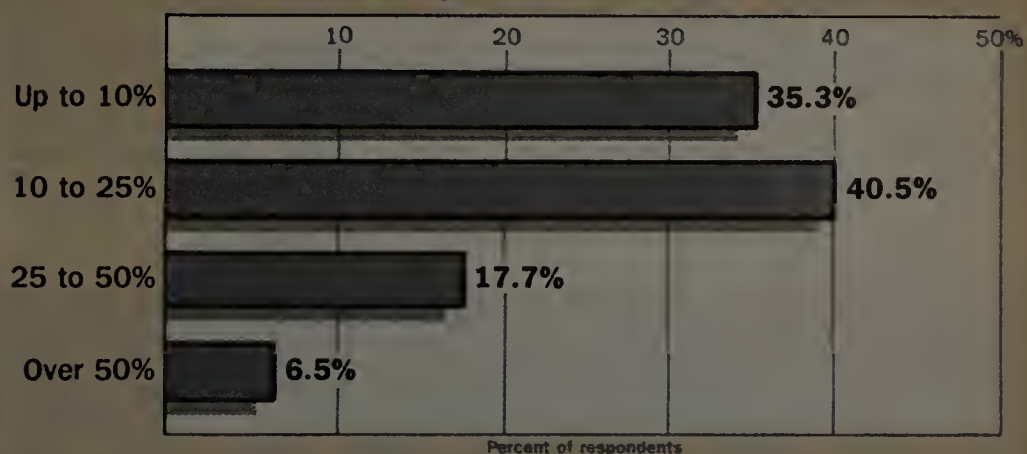
The study, "Local-Area Networks: Usage & Plans," also found that larger organizations place a higher premium on the ability to tie local networks into other communications systems such as wide-area nets, other departmental or work group networks within the organization and X.25 gateways.

Among those surveyed, 41% cur-

"I believe that our new 3+ Open network operating software will become the [Network File System] for Intel [Corp.] hardware platforms and the DOS and [Operating System/2] for network applications environments.

William Krause
President
3Com Corp.

Users estimate local network cabling costs as a percentage of total network costs



SOURCE: THE MARKET INFORMATION CENTER, INC., MARLBOROUGH, MASS.

rently had local networks installed in at least one site, and 23% were planning to install local networks. Among the users with installed networks, the average net linked 68 devices and eight printers.

The average is "skewed by a couple dozen sites that reported

huge networks," according to Barry Gilbert, executive vice-president of the research firm. Gilbert also said that some users reported networks connected by gateways and bridges as one network. The median number of nodes, which in-

See page 18

LANMARKS ERIC KILLORIN

The battle of the network titans

The long-awaited clash of the Titans is upon us. But the contestants, once expected to be IBM vs. AT&T, are now IBM vs. Digital Equipment Corp. With AT&T's dwindling market share of computer systems and a rumored spin-off of its computer operations to Ing. C. Olivetti & Co., S.p.A., AT&T is less a force to be reckoned with as a total systems and network provider. DEC has emerged as the front runner in challenging IBM, and local-area networks are the battleground for this confrontation.

DEC is gunning hard for IBM's turf in the computer room, and it is exploiting its local network arsenal. The comparative ease with which VAX users can share information in a DECnet network has quietly positioned DEC as the leader in connectivity. Moreover, DEC's local-area network wedge has become perhaps the biggest thorn in the side of IBM because DEC has delivered on what all others have merely promised: simplicity and integration.

IBM, by contrast, is scrambling to "DECtify" its product line and streamline communications between its dissimilar product families. IBM's recent announcements are an attempt to reinforce its equipment line with myriad

embellishments. Introduced under the label "telecommunications," these new products are intended to leverage the notion of total connectivity or voice and data integration.

The IBM product family receiving the most attention in this catch-up game is the 9370 series, a new processor based on the System 370 file structure and affectionately known as the "VAX killer." By networking the Dickens out of the 9370, IBM hopes to offer peer-to-peer functions comparable to what DEC offers with personal computers, terminal servers, minicomputers and VAX Clusters.

Indeed, the three chief product families within IBM (Personal Computer, System/36 and System/370) will be made compatible by the familiar IBM method of bolting on new functions. That method involves developing numerous add-on software packages and communications hardware options with dollar signs next to each one.

What makes this titanic battle worth watching has less to do with the products themselves and more to do with the theatrics staged by each player. For example, IBM is releasing announcement after announcement targeted at the MIS manager, whose attention is becoming less focused on crunching numbers than on moving those numbers from desktop to desktop. Recently, it seems every phrase

See page 18

Killorin is the publisher of "Net-line," an industry newsletter on computer networks, a publication of Hyatt Research Corp., Andover, Mass.

NETWORK NOTES

Personal computer network vendor Corvus Systems, Inc. recently reduced its work force by about 25% and announced the closing of all five of its domestic sales offices in an effort to cut costs and streamline operations. Corvus eliminated 46 employees from a work force of nearly 220.

Corvus, based in San Jose, Calif., also said it expects its fourth quarter, which ended May 31, will reflect a loss when audited results become available in August.

A Corvus spokesman said the layoffs were necessary for several reasons. "First, we have to reduce expenses," he said. Corvus, which had been manufacturing microcomputers compatible with IBM Personal Computers, also decided it was inappropriate for the company to remain in that business. As a result of that decision, manufacturing jobs were eliminated in that area of the company.

Corvus will continue to emphasize its distributor and value-added reseller channel but will now manage that channel from headquarters, rather than through local offices. International sales offices were not affected. Some of the funding previously provided for local sales offices will be channeled to advertising, promotions and reseller support programs, which Corvus believes will be more effective for distributors and value-added resellers.

Separately, Corvus said a court granted Union Bank a writ of attachment against Corvus's unsecured assets. The bank sought the attachment order after KSI Disc Products, 50% of which is owned by Corvus, defaulted on a \$5 million loan. The court required the bank to wait until after July 8 before attaching any assets in order to give Corvus time to appeal the ruling. The court also ordered the bank to post a \$5 million bond before attaching any assets to protect Corvus from any damages should the ruling be overturned.

Micom-Interlan, Inc., based in Boxborough, Mass., announced its intention to support IBM's Personal System/2, Operating System/2 and Microsoft's LAN Manager. Development of dumb and intelligent Ethernet adapters that will operate with IBM's Micro Channel bus architecture, used in the PS/2 Models 50, 60 and 80, is under way. Micom expects to ship at least one model of the new adapters by the end of the year. Micom also said it plans to provide networking software support for IBM's DOS 3.3, as well as OS/2 and the LAN Manager. Although no details

See page 18

The battle of the network titans

continued from page 17

from IBM just oozes with the promise of a buzzing world of happily networked systems.

DEC has much to lose if IBM is successful in convincing local-area network buyers that it can offer greater flexibility and a more stable migration path than the VAX/VMS world. And while DEC has very substantial cash reserves, it would be an understatement to say that its opponent has the wherewithal to pull out all the stops in limiting further penetration by DEC. IBM could simply outspend DEC.

During the next six months, this

Battle of the Titans will reach fever pitch. DEC World is coming up this fall, and it would be surprising not to see some notable local network announcements there.

IBM is pushing its Systems Applications Architecture (SAA) forcefully as the elixir for an ailing peer-to-peer local network implementation. Operating System/2, the operating system for IBM's new Personal System/2 family, will also be an important aspect of IBM's frontline attack on DEC's low end.

If you thought the Coke/Pepsi battle was one for the textbooks, turn your taste buds to the IBM/DEC duel. What is lacking in substance will probably be made up in packaging. 

Users cite key LAN applications

continued from page 17

clude any device physically connected to the network, was 12.

Among those who already had networks installed, Ethernet is the most widely used networking scheme, with 35% of the local network installations. IEEE 802.5 token-ring networks made up 17.3% of the networks installed; 3270 terminal server-based networks made up 13.9% of the installations; Manufacturing Automation Protocol-based networks made up only .6% of the networks installed; and all other types — primarily proprietary — made up 32.9%.

Despite the widespread use of Ethernet, IBM local networks com-

prised the largest number of installations, with 27%. Digital Equipment Corp. followed with 15%, Novell, Inc. with 12%, 3Com Corp. with 6%, and AT&T and Sytek, Inc. both with 4% of the networks installed at surveyed organizations. Some 23 firms made up the "other" category, which accounted for 32% of the network vendors installed.

Network users in the sample were asked to rate their networks on the basis of ease of installation, ease of expansion, response time, technical support, vendor maintenance and overall reliability. Users ranked the networks on a scale of one to five (lowest to highest), with ratings falling into a fairly narrow range no lower than 2.86 and no higher than 4.14.

IBM ranked lowest in four of the six categories, including ease of installation and expansion, response time and overall reliability. Conversely, DEC received the highest ranking in four of the six categories, including response time, technical support, vendor maintenance and overall reliability. DEC tied with Novell for the highest rank in the ease-of-installation category.

Respondents were asked to express their preferences on a number of wiring schemes, including fiber-optic and twisted-pair wiring. Some 22% of those surveyed said that they currently use fiber-optic cabling, and another 30% said they planned to use fiber in the future.

When asked whether they would use existing twisted-pair wiring installed for phone systems in their buildings for local networks, nearly half of the users said they would do so to eliminate the costs of cable installation.

Those costs, according to 40.5% of the users, account for between 10% and 25% of the total cost of implementing a local network. Another 36.3% said cabling costs account for less than 10% of the total cost of a local network. 

Network Notes from page 17

were released, Dave Tolwinski, vice-president of marketing, hinted that Micom-Interlan may extend the firm's implementation of the Department of Defense's Transmission Control Protocol/Internet Protocol and Sun Microsystems, Inc.'s PC/NFS to support DOS 3.3, OS/2 and the LAN Manager.

In commenting on Micom's plans to support the LAN Manager, Tolwinski said, "3Com and Microsoft are going to make a fairly substantial impact on the business. We want to provide interoperability between work groups, and between work groups and the departmental level. We have to play with all the major de facto and de jure standards."

Milpitas, Calif.-based **Univation, Inc.** enhanced its Lifenet local network operating system to support IBM's Token-Ring adapter cards and Personal System/2 hardware. The Token Ring-compatible version will be available in August. 

Now Your Small PC Network Can Have Big Network Connections.

CROSSTALK® Network Version opens a wide world of communications potential for any user on your IBM PC Network, Token Ring Network, or other NETBIOS-compatible network. Any computer on your network can share 1 or 2 modems and phone lines, plus something just as important—the flexibility and range of communication that CROSSTALK is famous for.

CROSSTALK gives any workstation a wide range of terminal emulations and protocols, to allow file transfer with other PCs, other PC networks, minis, and mainframes. It also speeds error-checked file transfer within the network, at high speed, without going through the server. Our network version has all the user convenience you've learned to expect from CROSSTALK. Menu or command. Help system. Simple language. Automated script files. Ask your dealer about it. Or write for details.

Digital Communications Associates, Inc. / 1000 Holcomb Woods Parkway
Roswell, Georgia 30076 / 1(800)241-6393

CROSSTALK is a registered trademark of Digital Communications Associates, Inc.

CROSSTALK
NETWORK  VERSION

COMMUNICATIONS MANAGER

“Gone are the days when the communications industry was technologically driven. We’re in a market-driven business today.

Bruce Smith
President

Network Equipment Technologies, Inc.
Speaking at Dataquest, Inc.’s Telecommunications Industry Conference in Napa, Calif.

► MANAGEMENT INSIGHTS

Success boils down to strength of staff

Johnson & Johnson exec talks hiring, training.

BY MICHAEL FAHEY
Senior Writer

NEW BRUNSWICK, N.J. — Building, training and maintaining a topflight staff are the key ingredients for a successful communications operation, according to Nick Kaltnekar, voice communications manager at Johnson & Johnson, the giant health care products company headquartered here.

“I’ve got people I can put on a plane to one of our remote locations and say, ‘Don’t come back until the problem is fixed.’ They are bulldogs,” Kaltnekar said. “I’m comfortable knowing that no matter how bad a problem is, the staff can take care of it.”

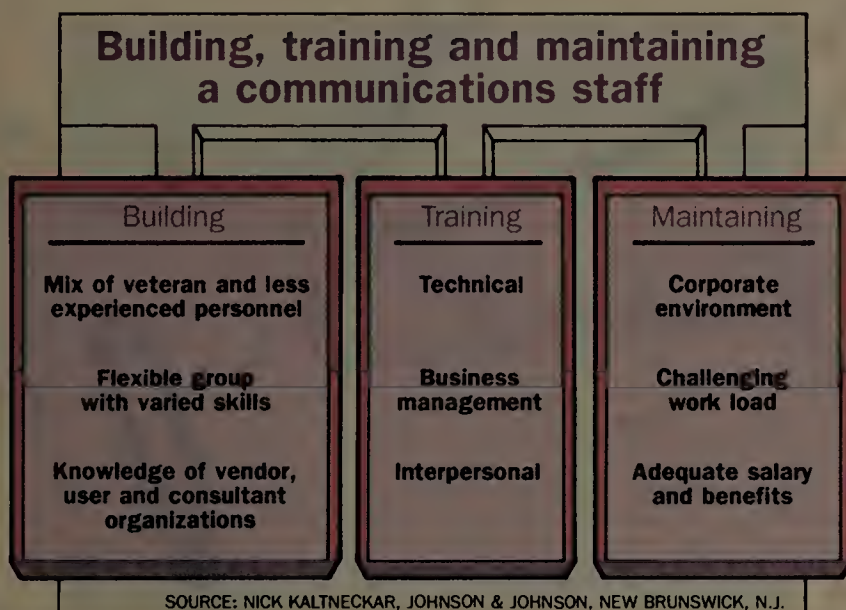
Finding and keeping personnel of that caliber is not easy, and Kaltnekar devotes a good deal of his time and effort to staffing.

Perhaps the most difficult part of the job is finding qualified communications personnel. “It is a competitive environment, and that makes it hard to find qualified people,” Kaltnekar said. “It seems like our needs are constantly changing. Right now, people with DEC or network

management experience are difficult to find. Frankly, I’ve always found it necessary to deal with personnel placement agencies.”

Kaltnekar said he finds writing precise job descriptions minimizes time spent interviewing inappropriate job candidates.

See page 21



► DATAQUEST CONFERENCE

Users forcing vendor moves

BY MARY PETROSKY
West Coast Correspondent

NAPA, Calif. — Users’ communications needs are increasingly the driving force behind the evolution of vendors’ networking strategies, according to speakers at a recent Dataquest, Inc. conference here.

As more corporations come to view their networks as strategic weapons, users are demanding more flexibility in linking network equipment and more control over their networks, said session speakers during Dataquest’s Telecommunications Industry Conference on connectivity. Dataquest, a market research firm, is headquartered in San Jose, Calif.

Those user requirements, which are being voiced more loudly of late, are forcing vendors, including IBM, to support international standards as part of their connectivity strategies.

“Standards in a multivendor environment are imperative. IBM is committed to embracing national and international standards,” said Ellen Hancock, IBM vice-president and president of IBM’s Communication Products Division. Hancock, who has pledged Big Blue support for such stan-

dards on occasions in the past, also noted that IBM is committed to opening up both Systems Network Architecture and NetView so that other vendors can tie into these environments.

But vendors and analysts attending the conference expressed skepticism about IBM’s commitment to standards other than the de facto standards it has already created. IBM is supporting the Open Systems Interconnect (OSI) model only to the degree its European customers require it, said Douglas Tsui, product line manager for Bridge Communications, Inc., Mountain View, Calif.

And IBM is “opening up” SNA to reinforce it as a de facto standard, Tsui added.

Hancock attempted to counter that view during her speech. “There’s a widespread perception that OSI competes with SNA — that’s completely unfounded,” Hancock said. “SNA is IBM’s architecture to link multiple IBM systems. OSI is an international standard being developed to interconnect entire networks. SNA and OSI really are complementary,” she said.

Although communications vendors agree that international standards are the

See page 21

GUIDELINES

CHARLES KAHN

Seeing discipline in a positive light

Discipline is a training tool, an educational process to improve future behavior on the job, never to punish or humiliate an employee.

Successful disciplinary action is based on three ingredients:

- A corporate policy delineating the firm’s approach to discipline. Emphasis must be placed on consistency, steps to be followed and an audit trail to ensure fairness.
- A corporate disciplinary code that defines infractions and notes appropriate corrective actions.
- A discipline form that details code violations and the corrective actions taken.

Usually discipline is a four-stage process, beginning with an informal dialogue with the violator. In 90% of the cases studied, this initial step is all that is required to correct employee misconduct on the job. A repeat of an undesirable action results in a formal oral warning and, if necessary, a written warning. Formal oral and written warnings are documented on the corporate discipline form and recorded in an employee’s personnel file.

The final step in the procedure is specific action. When an employee cannot be trained to exhibit the required behavior on the job, formal action must be taken. Based on company policy, such action can range from a day off without pay to discharge.

Use of the “hot stove rule” — anyone who touches a hot stove gets burned — is critical to successful constructive discipline. All violators of company rules and policy get burned equally and immediately. Consistent discipline provides equal opportunity for all to learn proper workplace deportment. Action is essential while the infraction is still clear in the employee’s mind. Delaying disciplinary action until the next day, or after a weekend, does a disservice to both employer and employee.

Flexibility is as important as consistency and is essential to proper handling of an infraction. Before acting on a possible disciplinary problem, a manager must thoroughly investigate the alleged incident. Accepting second-hand information can lead to credibility problems with employees and put the manager in a difficult position with upper management. When advised of an alleged infraction, the manager must personally check into the situation to gain full knowledge of its dimensions and nuances.

The manager should act only when all the pertinent facts are known, so that if an employee decides to take the case to higher management, the manager will have solid evidence to justify the course of action taken.

Because extenuating circumstances can warrant a different disciplinary approach, the manager involved should make the following questions part of the investigation.

Was there provocation? Are company rules clear about the offense? Has the company consistently applied corrective action for this offense in past

Kahn is an Orlando, Fla.-based communications and management training consultant.

See page 20

DIALOGUE

Is ISDN part of your strategic communications planning?

“I would not say that it is an active part of our planning. It is taken into consideration, however.

I think ISDN is at least three years away in terms of ubiquitous nationwide availability and a nationwide network.

Also, I'm not all that sure it will be very advantageous to us in terms of cost.

Let's just say we are taking a wait-and-see attitude toward it.

Gary Ho

Director of data communications services
Transamerica Information Services
Los Angeles

“I'm actively looking at it and discussing it with my equipment vendors and carriers.

If I could, I would implement it tomorrow. It will help me meet our voice and data communications needs.

Tony Costa

Vice-president of telecommunications
World Savings and Loan Association
Oakland, Calif.

“We will look at ISDN when it becomes a little more concrete. Right now, it is pretty blue-sky.

Pat Russell

Manager of technical services
Peoples National Bank
Seattle, Wash.

“ISDN has not been clearly defined, and to the extent it has been defined, it doesn't do what I want it to do.”

“It is part of our planning. We are following the ISDN trials, talking to other users and discussing it with our vendors.

We are planning a new network for Wickes and its subsidiaries, and we are studying how ISDN will fit into that network.

Larry Mothersbaugh

Senior telecommunications analyst
Wickes Co.
Santa Monica, Calif.

“ISDN has not been clearly defined, and to the extent it has been defined at all, it doesn't do what I want it to do. It is too restrictive. What I really want is a software-defined network, but that is another term that causes a lot of confusion.

I want to be able to expand and contract and reconfigure my bandwidth anyway I want to, any time I want.

Sid Smith

Manager of telecommunications
Crowley Maritime Corp.
San Francisco

“Right now, we think ISDN is a bit futuristic. We will wait six months to a year before we begin taking a really hard look at ISDN.

Angel Rodriguez

Engineer
The Hospital of the Good Samaritan
Los Angeles

Seeing discipline in positive light

continued from page 19

situations? Is the contemplated corrective action reasonable and appropriate? Has the employee committed other infractions, and if so, how recently?

When these questions are answered to the manager's satisfaction, corrective action should be taken in private. A one-on-one dialogue is important to ensure proper discipline. Never discipline in public in order to make an example of someone. This can backfire if the employee becomes resentful or if work groups become divided.

The manager's action can determine whether the employee's fu-

ture behavior will improve. The manager should focus on the immediate problem and avoid making any personal judgments about the employee's character. The manager should avoid displaying anger, hostility or sarcasm.

Avoid making any personal judgments about the employee's character.

An informal interview environment is best, since a relaxed employee may provide insight into problems and allow for a more productive solution. Managers should never pass the buck by saying they were obligated to conduct the in-

terview because “higher management expects it.”

During the interview, the employee's obligations to the manager and to the organization must be emphasized. At the conclusion of the interview, the manager should make a note of the dialogue, and of the outcome, in the employee's personnel file. Employees should be asked to sign the note, attesting to its accuracy, and they should receive a copy of it at that time.

Constructive discipline is not a substitute for structured employee training and effective supervision; rather, it is an adjunct to those functions. Constructive discipline enhances quality training and supervision, and, when applied professionally, it also raises morale. □

A large, stylized handwritten signature that reads "Karl Hermann" is written across the top of the page. Below it, there are three more handwritten signatures, which appear to be "Edwin", "Nick", and "Paul", written in a similar cursive style.

Now you know four of our most innovative people on a first name basis.

Karl, Edwin, Nick and Paul were recently honored for their accomplishments by being made IBM Fellows. For the next five years they'll be given the freedom to pursue projects of their own choosing.

Karl Hermann improved the manufacturing techniques of printed circuit boards, and created methods for assembling and testing computer circuits that ensure the quality of IBM products.

Edwin R. Lassettre conceived efficient software designs that

Success boils down to staff

continued from page 19

Johnson & Johnson's communications staff consists of 32 people in three groups: voice, data and a small administrative services group that handles billing, the ordering of private lines and administering moves and changes. A director, who reports to the company's vice-president of management information services, oversees the three groups.

Kaltnekar runs the 15-person voice group that supports corporate headquarters and provides consulting services for some 160 Johnson & Johnson affiliated companies.

Johnson & Johnson's management is interested in using communications as a strategic weapon, Kaltnekar said. The days are gone when just cutting costs was the central goal of the company's communications operation, he said. As a result, he said he looks for people who understand business and can convey the importance of technology to upper management.

Because upper management is aware of the importance of all aspects of information technology, Kaltnekar said, company executives are receptive to new ideas and innovation in communications. But, he added, telecommunications personnel must gain the confidence of management by displaying technical and interpersonal skills.

"We look for people who can demonstrate their credibility, who can say, 'This is what a new telephone system or call detail reporting system can do for you,'" he said.

Johnson & Johnson telecommunications staffers generally have worked for vendors, other user organizations or consultants. Kaltnekar said employees who used to be consultants usually have strong communications skills.

Kaltnekar said his efforts to promote ongoing staff training is made easier because Johnson & Johnson has a corporate policy of encouraging employee training and education and offers liberal education benefits.

It is important to have a commu-

nications staff that has a blend of veterans and less experienced personnel, he said. The veterans have both technical experience and credibility with management that non-veterans lack. But, "It's fun to take someone and train them to do what you need," he said.

In order to retain staff members, Kaltnekar said, it is important to assign them to tasks that fit their skills. He said his experience has shown that employees are unchallenged more often than they are overwhelmed in their jobs.

Offering competitive salaries is also an important factor in keeping valuable employees, Kaltnekar said. "It's a competitive environment, and you have to offer realistic compensation." □

Users forcing vendor moves

continued from page 19

key to multivendor connectivity, a battle seems to be brewing over whose network management scheme will reign supreme. Both IBM and AT&T executives agreed users want end-to-end network control, and each company voiced a commitment to providing that capability.

While IBM has already folded its network management products under the umbrella of NetView, AT&T has yet to integrate its network management products, said Richard Snowden, director of AT&T's Concept Development Center.

AT&T is looking into this type of integration, Snowden said.

Snowden also mentioned that AT&T is working with other vendors to develop a standard interface that can be used with any network management product. "AT&T is not trying to replace existing network management systems — we're trying to interface to them," Snowden said.

IBM is encouraging vendors to tie into NetView. "Our objective is an open, published set of protocols available to any vendor," said Lark Allen, manager of IBM's Telecommunications Market Program.

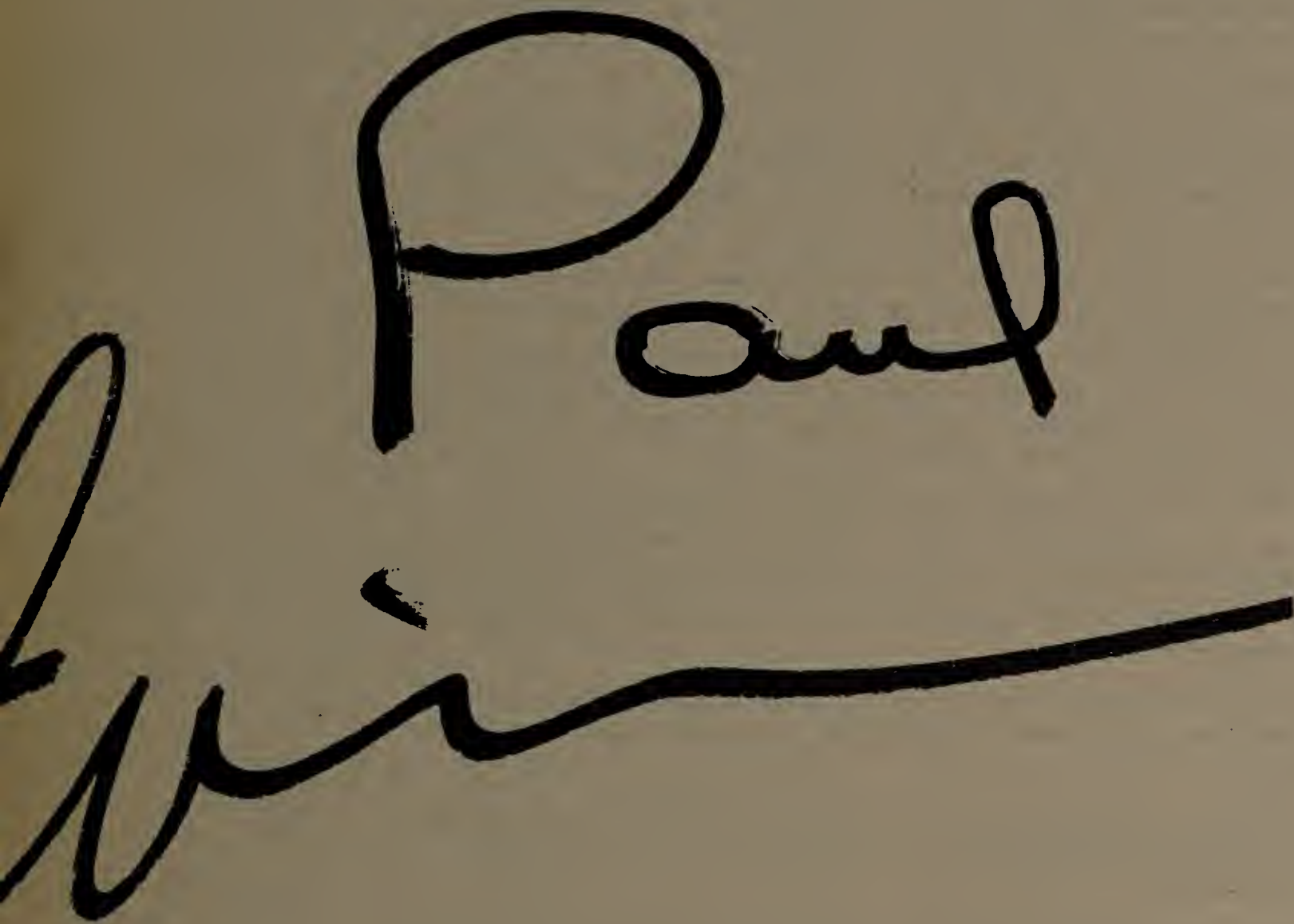
In addition, IBM is having discussions with AT&T and the Bell operating companies about their support for the NetView interface, Allen said. For its part, IBM is offering to support the OSI network management standards.

Although the BOCs have an obvious need to control their networks, their role in user network management is unclear. However, both AT&T's Snowden and Jerald Johnson of Bell Communications Research, Inc. noted that the signaling capabilities of the Integrated Services Digital Network hold great potential for network management.

ISDN's signaling capability provides a seamless link between a carrier's network and a customer's network, Snowden said.

And since the ISDN "D" channel has unused capabilities, he said, "it's a natural for network management, and we intend to use it that way." □

© IBM Corporation 1987



simplified data processing on many of IBM's larger computers.

Nicholas J. Pippenger invented the theory used to identify problems that can be solved efficiently by parallel processing.

And Paul A. Totta made possible many advances in semiconductor metallurgy that significantly contribute to the reliability and performance of IBM computers.

Over the years, many IBM men and women have been recognized for innovations that benefit our customers. And though we couldn't include all their names, they all share these three initials.

IBM



“...I’m looking for vendors who take a systems approach to networking.

And I find them in *Network World*...”

Robert Stark is Manager of Network Operations for Litton Industries of Beverly Hills, California. He supervises the company’s voice network analysts as well as those analysts who provide telecommunications consulting services to Litton divisions.

In this position, he is also charged with establishing specifications and making recommendations for the purchase of network communications equipment. And in order to carry out these responsibilities, Robert turns to *Network World*.

“Reading *Network World* definitely helps me in my job. I get crucial information about the viability of certain vendors, which lets me know if I should enter a business relationship with long-term expectations. In my job I’m looking for vendors who take a systems approach to networking. And I find them in *Network World*, which covers networking from a systems point of view.

“*Network World* is required reading for my department. That’s because it provides total coverage of all levels of networking. Whether it’s voice, data, local area, or wide area, *Network World* has it covered. It’s our primary source for information on user trends and emerging technologies as well.

“Full of stories of actual user experiments and successes, *Network World* is also a great source of ideas for getting the most from our systems.

“Everything — including the ads which provide additional information on vendors and products — contributes to the overall value of *Network World*.”

Each week, over 65,000 purchase-involved subscribers — like Robert Stark — look to *Network World* for the information that can help them and their companies stay ahead. If you market communications/networking products and services, there’s no better place to reach a powerful audience of buying decision-makers. Call your local *Network World* sales office and reserve space for your ad today.

NETWORK WORLD

The Weekly for Leading Users of Communications Products & Services

375 Cochituate Road, Box 9171, Framingham, MA 01701-9171

BOSTON (617) 879-0700/NEW YORK (201) 967-1350/NEW JERSEY/PENNSYLVANIA (201) 967-1350/
WASHINGTON, D.C. (301) 721-4763/ATLANTA (404) 394-7509/CHICAGO (312) 827-4433/
SAN FRANCISCO (415) 328-4618/LOS ANGELES (714) 250-3006

An IDG Communications Publication

NEW PRODUCTS AND SERVICES

See inside for:

- ▶ 9.6K bit/sec modem
- ▶ LU 6.2, RJE emulation packages
- ▶ EasyLink gateway

VOICE MESSAGING

New VMX packages aid administrators

BY JIM BROWN

New Products Editor

DALLAS — Voice messaging heavyweight VMX, Inc. recently announced three software utilities for its Voice Message Exchange aimed at easing system administration tasks.

The announcement included a pair of tools that allow a system administrator to use a host-attached terminal or personal computer as a Voice Message Exchange operator console and software that schedules system administration tasks to be run at user-defined times.

The firm also announced software that allows users to enter commands from a telephone keypad to designate which employees will receive a copy of a voice message or voice memo.

The Host Data Link includes software and a Data Link Processor card. They link the Voice Message Exchange to a host computer or personal computer over an asynchronous RS-232 link at speeds up to 9.6K bit/sec.

The link enables a system administrator to use a terminal or personal computer to update the Voice Message Exchange's data base of users. The link also allows administrators to extract data from the Voice Message Exchange and download it to a host computer or personal computer to prepare usage and call activity reports.

VMX will publish the protocols used with the link to enable customers to develop host appli-

cations employing the link.

The new Auto Scheduler program allows administrators to schedule such things as activity reports, on-line storage recovery and other on-line Voice Message Exchange tasks to be run automatically at user-defined intervals. The package is configured from either the system's operator console or from a host-attached terminal over the Host Data Link.

The system's User Changeable Group package allows customers to use their push-button telephones to create a new internal voice message distribution code, change an existing group code or review members in each group code. Previously, the system administrator had to perform these tasks from the operator console.

After making changes, the system will record the user's spoken group code name, and the recorded group name will be played back at the start of each voice message. The cost for the Host Data Link software and Data Link Processor card is \$3,500. The Auto Scheduler and User Changeable Group Code software is available free of charge as an upgrade to the Voice Message Exchange 5000 series announced last fall. The recently announced Voice Message Exchange 1000 series is being shipped with these new features.

VMX is located at 17217 W. interview Pkwy., Dallas, Texas 75252, or call (214) 907-3000. ☐

PC-TO-MAINFRAME

Lotus enhances micro-host link

T-A-C upgrade lets users tap into DB2.

BY JIM BROWN

New Products Editor

CAMBRIDGE, Mass. — Lotus Development Corp. last week enhanced The Application Connection (T-A-C) to enable IBM Personal Computer users to extract data from IBM's DB2 data base management system.

The enhancement, made possible by the release of a mainframe module for DB2, will enable Personal Computers outfitted with a T-A-C software module to compile requests for mainframe data. The mainframe DB2 module receives that request, extracts the data and converts it to personal computer format before downloading it.

Other T-A-C mainframe modules are available for IBM's SQL/DS, Information Builders, Inc.'s Focus, D&B Computing Services, Inc.'s Nomad 2, On-Line Software International's Ramis II and SAS Institute, Inc.'s Base SAS.

The T-A-C Personal Computer module was also enhanced to enable users to compile requests for mainframe data with commands within personal computer applications. The new module will then translate the command syntax to the syntax used by the mainframe DBMS. Once received, the mainframe data is loaded directly into the application. Modules supporting this function are available for Lotus' 1-2-3 spreadsheet and Symphony packages as well as Ashton-Tate's dBase.

Previously, users had to switch out of the personal computer appli-

cation and access a menu-driven T-A-C data request compiler. The user also had to load files received from the mainframe into the application before proceeding.

Lotus also said it will publish the standards used to compile T-A-C data extraction requests from within a personal computer application. With those published standards, application developers can build subroutines into other applications that allow users to submit data extraction requests to the mainframe without leaving the Personal Computer application.

Other T-A-C enhancements allow MIS department personnel to configure T-A-C's mainframe module to limit the number of data base records that can be extracted per request and to limit the number of records each personal computer user can request. The mainframe module can now also be configured to require a password.

The enhancements will be distributed to licensed T-A-C users as part of the yearly license renewal process. License renewal fees run 15% higher than the initial license fee.

The price for the base mainframe module ranges from \$10,000 to \$13,000, while the options needed to access the various DBMSs are priced at between \$8,000 and \$15,000 each. The personal computer module is priced between \$100 and \$200, depending on the options ordered.

Lotus is located at 55 Cambridge Pkwy., Cambridge, Mass. 02142, or call (617) 577-8500. ☐

DATA COMMUNICATIONS MARKET DEBUT

Emulex synchronous modem bows

BY JOY KALFOPULOS

Network World Staff

COSTA MESA, Calif. — Emulex Corp., one of the largest manufacturers of plug-compatible peripherals for Digital Equipment Corp. processors, recently entered the end-user data communications market with the introduction of a low-cost 14.4K bit/sec modem.

Supporting full-duplex transmissions, the Emulex Performance 1000/14.4 is a synchronous, point-to-point leased-line modem costing

\$1,795, roughly the same as most 9.6K bit/sec modems, the company said.

Comparable 14.4K bit/sec modems normally cost \$3,000, Emulex reported.

The Performance 1000/14.4, which uses trellis-coded modulation, is configured through a 16-character liquid crystal readout that displays a series of menu-driven English language commands.

Front-panel switches also allow a local unit to perform diagnostic

tests on remote counterparts.

The modem's diagnostics include remote and local analog loop-back, remote and local digital loop-back, local-line loop-back, bilateral digital loop-back, as well as a test pattern used to test remote and local analog loop-back, remote digital loop-back and signal quality.

The modem is said to extend the error-reduction function of trellis coding to its fallback operating speeds of 12K bit/sec and 9.6K bit/sec. A third fallback rate of 4.8K bit/sec is supported as part of the

device's V.29 compatibility.

The unit will also automatically adjust its speed to match line conditions.

Use of a proprietary very large scale integration chip set provides for a small footprint, 8.5 in. by 2.5 in., one of the smallest in the industry, Emulex said.

The company also announced the Performance 1000/9.6, a \$1,295 9.6K bit/sec V.29 compatible modem.

Emulex said the new products will be sold through a series of seven distributors nationwide.

Emulex is located at 3545 Harbor Blvd., Costa Mesa, Calif. 92626, or call (800) 368-5393 or (714) 662-5600 within California. ☐

► MCI E-MAIL SOFTWARE

Link for Wang Office bows

BY JIM BROWN
New Products Editor

WASHINGTON, D.C. — MCI Communications Corp. recently introduced software that allows the electronic mail component of Wang Laboratories, Inc.'s

Wang Office software to exchange messages with MCI's public E-mail service, MCI Mail. The MCI Mail Link for Wang Office is a Wang VS minicomputer program developed by Information Management Consultants,

Inc., a Wang-approved software developer. The program converts Wang Office E-mail messages for transmission to any MCI Mail subscriber or subscribers of other E-mail services to which MCI Mail is linked. MCI Mail's hard-copy de-

livery service can also be employed, meaning messages created on Wang systems can be delivered via telex, the postal system, overnight courier and four-hour courier service. The four-hour courier service is currently only available within 25-mile radii of New York, Chicago, Los Angeles and Washington, D.C. MCI Mail users are also able to address E-mail mes-

sages to Wang Office users. The MCI Mail Link to Wang Office package will convert incoming messages to Wang Office E-mail format. The announcement expands the number of host-based systems MCI Mail can support to three, including Digital Equipment Corp.'s All-In-1 and IBM's Professional Office System message system. MCI Mail also provides a link into CompuServe, Inc.'s E-mail system as well as into the Dow Jones and Company, Inc.'s Dow Jones News/Retrieval Service.

The MCI Mail Link for Wang Office can be purchased for \$1,700.

MCI Mail's per-message charge starts at 45 cents for the first 500 characters. The next 7,000 characters cost 55 cents, and each additional 7,500 characters cost \$1. The charge to deliver a message from MCI Mail to a Telex machine is 45 cents per telex minute, while the charge to deliver hard-copy MCI Mail messages ranges from \$2 to \$30, depending upon the delivery option.

MCI Communications is located at 1133 19th St. NW, Washington, D.C. 20036, or call (202) 872-1600.◻

► TVMP, INC.

Portable data jack out

HOUSTON — Start-up TVMP, Inc. recently introduced a portable data jack with a built-in A/B switch that enables modems, portable computers, facsimile machines and other data devices to be linked quickly to telephones for temporary use.

The Phoneflex has two RJ-21 modular jacks and is installed between a telephone and its handset. The Phoneflex is plugged into the station set, and the handset is plugged into the Phoneflex. The Phoneflex also has a male RJ-11 for connection to appropriate data devices.

The product is intended to give users a way to patch quickly into a telephone line for data communications while retaining the ability to switch back to voice support when necessary.

The Phoneflex costs \$198.95. TVMP can be contacted at P.O. Box 771869, Houston, Texas 77215, or call (800) 762-3361.◻

What's the Score in Distributed Matrix Switching?

	Data Switch	Other
1 Does the vendor offer a true distributed matrix switch (versus an electronic patch panel)?	Yes	
2 Is the distributed switch fully operational at the maximum announced matrix size when all satellite switches are attached?	Yes	
3 Are there any documented problems with the control software, resulting in inability to control the switch?	No	
4 Are systems being delivered to customers as promised, or have shipments been delayed?	Yes—on time	
5 How many latest-generation distributed switches have been shipped to customer sites?	200+	
6 Can references be contacted, with sites visited?	Yes	
7 How large is the vendor's in-house service organization?	75	
8 Is local customer service available from vendor's in-house organization?	Yes	
9 Is performance monitoring integrated in the distributed matrix switch?	Yes	
10 How much distance does the switch allow between DTE and DCE?	600'	
11 Does the switch provide V.35 support with no sacrifice in RS-232 ports?	Yes	

It's time to add up the score in the distributed communications matrix switch marketplace. Tear out this ad, and compare the capabilities and availability of competitive distributed switching systems with the proven criteria established by our Data Switch *Galaxy-Plus*.

At Data Switch, we know that *Galaxy-Plus* is the most advanced, *proven* switch available today. And, we know that no competitor within our markets can match the service and support we offer.

Prove it to yourself. Try to find any competitive switch that matches the 11 evaluation criteria set by *Galaxy-Plus*. Then call our Data Path Management Specialists at 1-800-328-3279; in Connecticut, 926-1801; or write Data Switch Corporation, One Enterprise Drive, Dept. 30, Shelton, CT 06484. We'll be pleased to demonstrate that *Galaxy-Plus* stands alone as the only choice for your data communications network application. At Data Switch, we deliver on our promises.



DATA SWITCH

DATA SWITCH
T-BAR
INTELLINET
CHANNELNET

The Data Path Management Company

► MICRO-INTEGRATION CORP.

Software upgrade out PCs gain access to DisplayWrite/36.

BY JOSH GONZE
Staff Writer

FRIENDSVILLE, Md. — Micro-Integration Corp. recently enhanced its Micro-SNA/5250 emulation software to allow IBM Personal Computers to bypass an IBM 5294 cluster controller when accessing IBM's System/36-resident DisplayWrite/36 word-processing package.

Previously, remote personal computers could access DisplayWrite/36 only through a 5294 cluster controller outfitted with a read-only memory-based Text En-

try Assist feature, according to John Parsons, president of Micro-Integration. By adding Text Entry Assist support to Micro-SNA/5250, users now bypass the controller.

In addition to support for the DisplayWrite/36 software, Micro-Integration's Micro-SNA/5250 now enables a personal computer to emulate an IBM 3180 display station.

Micro-SNA/5250, first released in January 1986, enables personal computers to access remote IBM System/3X processors and to emulate an IBM 5250 Model 12 terminal or a 5294 cluster controller.

As a cluster controller, the prod-

uct links up to nine terminals or printers in any combination. Users can switch among nine screens to view each device's activity.

Micro-SNA/5250 is available as a kit, including both an emulation board and software for \$895 or as just software for \$695.

The company also announced a personal computer-based test management system for the development and maintenance of IBM on-line systems using 3270 terminals. The product, dubbed OL/Test, catches system design errors by implementing test cases at various stages of system development.

The OL/Test software integrates a word processor and data base manager with the functions necessary to manage an on-line system testing effort. It also supports a test/record playback function, which allows mainframe data to be

captured on disk and stored for playback, one method of testing accuracy. Parsons said the major way OL/Test differs from other record/playback testing tools is its ability to document and verify the initial system design.

According to Micro-Integration, OL/Test can run and verify 3,600 transactions per hour. It cross-references tests by program, transaction, data base, data item and user-defined criteria.

OL/Test consists of software and a 3270 personal computer-emulation board, which connects to the host by a 3270 coaxial cable or an RS-232 connection. No host software is required.

A single OL/Test system costs \$4,995, including training.

The company can be reached at P.O. Box 359, Newmarket, N.H. 03857, or call (800) 237-5888. □

First Look

EasyLink offers gateway to EDS' Diamond users

Western Union Corp. announced it will provide a gateway between its EasyLink electronic mail service and Electronic Data Systems Corp.'s Diamond Communications E-mail facilities.

Diamond Communications links eight incompatible E-mail systems into a single network used by 35,000 General Motors Corp. employees.

Western Union's new gateway software will reside on an IBM mainframe running Professional Office System software within the Diamond Communications network. The new gateway will convert Diamond Communications E-mail messages for transmission over the EasyLink network. Likewise, incoming EasyLink messages will be converted for delivery to Diamond Communications users.

In addition to delivering messages to electronic mailboxes, EasyLink delivers E-mail messages to Telex users and provides Mailgram messages, telegrams and other hard-copy message delivery options.

Diamond Communications users will be charged the EasyLink user fee. Sending a 7,000-character message to EasyLink will cost approximately 65 cents.

Western Union Corp., One Lake St., Upper Saddle River, N.J. 07458, or call (201) 825-5000.

Gandalf introduces 9.6K bit/sec modem

Gandalf Data, Inc. introduced a CCITT V.32-compatible modem that transmits over dial-up or two-wire leased lines at speeds up to 9.6K bit/sec.

Designed for use in metropolitan-area networks, the **Access Series V.32** supports full-duplex synchronous or asynchronous operation. The software-controlled product will transmit over dis-

tances of up to 200 miles but can reportedly operate over longer distances when used with a high-quality long-distance dial-up line.

The modem is compatible with CCITT V.32 recommendations and can communicate with CCITT V.22-, V.22bis- and Bell 212A-compatible modems. It also features automatic adaptive equalization and uses the High Level Data Link Control protocol for error checking. The modem also has enough memory to store a 40-number telephone directory, comes with a non-volatile memory that stores configuration parameters and features a slate of diagnostic and loop-back testing capabilities.

The Access Series V.32 costs \$2,295.

Gandalf Data, Inc., 1020 S. Noel Ave., Wheeling, Ill. 60090, or call (800) 722-9638.

NSA releases LU 6.2, RJE emulation packages for PC

Network Software Associates, Inc. introduced two software products that allow IBM Personal Computers outfitted with Digital Communications Associates, Inc.'s Irmax emulation boards to support IBM's LU 6.2 and remote job entry (RJE) protocols.

The **Adapt3274 LU6.2/I** package allows an IBM 3274 or 3174 cluster controller-attached personal computer to access a mainframe-based application using IBM's LU 6.2 Advanced Program-to-Program Communications protocols, a suite of programming verbs that links personal computer applications to mainframe applications.

The package lets personal computer users inject predefined LU 6.2 subroutines into existing programs, and it allows programmers to place LU 6.2 verbs into programs written in BASIC, C, COBOL and Assembly languages.

It also provides an interactive tutorial that allows personal computer users to become familiar with LU 6.2.

Adapt3274 RJE/I allows the Irmax-outfitted personal computer attached to a 3274 or 3174 cluster controller to emulate an IBM 3770

RJE workstation. With the package, the personal computer can access an IBM mainframe running the Job Entry Subsystem or other VTAM batch processing applications.

The product provides file transfer capability and also allows files to be routed through the host to other remote stations. In addition, files can be transferred from the personal computer in background mode while other PC-DOS functions are performed on the personal computer screen.

Both products run on an IBM Personal Computer or compatible equipped with 256K bytes of memory and a Digital Communications Associates, Inc. Irmax 3270 emulation board.

The **Adapt3274 LU6.2/I** costs \$485, and the **Adapt3274 RJE/I** costs \$985.

Network Software Associates, Inc., 22982 Mill Creek, Laguna Hills, Calif. 92653, or call (714) 768-4013.

Software links VAXes to Arcnet local nets

C&C/Comendec Ltd. introduced software that links Digital Equipment Corp.'s VAX computers to Arcnet local-area networks.

The **Q-ARC-CX** software is used with the firm's Q-bus-compatible Q-ARC-01 board to support connection of a VAX minicomputer to an Arcnet local net.

The software is broken into two pieces. One piece, dubbed the basic CX: device driver package, allows VAXes to send and receive Arcnet data packets in full-duplex mode. The other, called the Ancillary Control Processor (ACP), allows the VAX-resident Arcnet board to become multitasking and establish a logical connection that facilitates full-duplex data transfers between the tasks.

The **Q-ARC-CX**: device driver costs \$750 for a single copy. A copy of the **Q-ARC-CX**:/ACP software costs \$1,100.

C&C/Comendec Ltd., P.O. Box 280, 708 Mandrake Drive, Batavia, Ill. 60510, or call (312) 879-2074.

Automated operator, voice messaging systems debut

Microvoice Corp. introduced an entry-level version of its Apex automated operator system capable of answering four calls simultaneously. It also introduced a voice-messaging system that works in conjunction with its Apex automated operator.

The four-port **Apex** automated operator supports 100 incoming private branch exchange trunk lines and complements the firm's eight- and 16-port devices. Apex answers incoming calls with a pre-recorded digital voice message that presents the caller with a menu of options. Those options include entering the extension the caller wishes to reach or a single digit to be connected to a departmental operator.

Once entered, the Apex system puts the caller on hold and attempts to make the connection. If the line is busy or does not answer after a user-defined number of rings, the Apex system will deliver another prerecorded message presenting the caller with more options, including reaching an operator or the firm's new voice-messaging system.

The Apex system will route calls to one of up to 512 different extensions, including individual extensions and departmental operators. The product also features a microphone that allows users to revise and update the prerecorded operator messages. The system will also support special night and weekend messages.

The firm's IBM Personal Computer-based **Voicecenter 1000** voice-messaging system supports four or eight ports and is connected to the Apex automated operator via the PBX system. If the line being called does not answer or is busy, Apex will give the caller the option of leaving a voice message or connecting with a live operator.

A four-port **Voicecenter 1000** costs \$20,000, while an eight-port **Voicecenter** costs \$27,000. The four-port Apex costs \$7,995.

Microvoice Corp. is located at 5 Vanderbilt St., Irvine, Calif. 92718, or call (714) 859-1091. □

Opinions

WASHINGTON UPDATE

ALAN PEARCE

Democrat as technocrat

It is rare for a U.S. president or presidential candidate to have intimate knowledge of the telecommunications/information industry. But one of the many candidates in the 1988 presidential race has not only demonstrated a keen interest in the industry, he also knows a great deal about it.

Sen. Albert Gore Jr. (D-Tenn.) astounded a hard-boiled telephone industry audience recently when he fielded questions for 1½ hours on a wide range of telecommunications industry issues, including subscriber line charges, rules, the restrictions imposed on the Bell operating companies, the Third Computer Inquiry, open network architecture, local bypass, supercomputers, high data-transmission rates and the need for government and industry to invest in a high-speed fiber-optic network connecting the supercomputing centers in the U.S.

So impressive was Gore that Desmond Hudson, president of Northern Telecom, Inc. and the host of the conference, said, "There is no one in the policy-making arena today who is more aware of the government's role, both in fostering competition and in protecting society, than Sen. Gore."

Gore, who at 39 is the youngest of the current crop of presidential candidates, quoted from a speech by BellSouth Corp. Chairman John Clendenin, who said the nation is moving from POTS to PANS, that is,

Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.

from plain old telephone service to pretty amazing new stuff.

Gore said, "We need to avoid the PITS — potentially intimidating telecommunications systems. We must make sure that there are not a great many losers as we move into the information age."

Prior to his election to the Senate in 1984, Gore served for eight years in the House of Representatives, where he was a leading member of the Telecommunications Subcommittee.

Currently, he is a member of the Senate Commerce Committee and the Communications Subcommittee.

He was the first politician to introduce telecommunications-related legislation in the 100th Congress, when he reintroduced a bill from last year that would allow the BOCs immediate entry into information services and equipment manufacturing in return for repealing subscriber line charges.

The senator said, "I'm attracted to the possibility of new tariffed revenues to offset rising costs of local services. I'm almost entirely pleased with the Justice Department's recommendations regarding the Modified Final Judgment. The MFJ rules were experimental. Judge Greene recognized that by instituting the three-year review."

Gore also has specific views regarding the Federal Communications Commission and what it has been doing with the deregulation of the telecommunications industry. He said, "The FCC has not been committed to protecting the interests of the consumers and

the competitors. The immediate past chairman, Mark Fowler, went hell-bent for total deregulation, regardless of the consequences."

But Gore does like the Computer III decision and the regulatory and marketing concept known as open network architecture (ONA). He said, "ONA will stimulate competition and new business and technological developments by small companies. We cannot unleash the full array of technology until the local loop is entirely accessible and utilized to the hilt."

An avid technocrat, Gore is interested in robotics and supercomputers. He graduated from Harvard University in 1969 with honors, then attended Vanderbilt University's divinity and law schools, served in Vietnam, worked as an investigative reporter and was elected to Congress in November 1976.

No one can predict with certainty what chance Gore has of being elected president in 1988 or beyond. From today's perspective, however, his chances for next year appear to be slim at best, although he could be drafted as a vice-presidential candidate. His youth, his intelligence and his interest in our industry make him someone we should watch; not necessarily because he agrees with certain industry segments on major issues, but because he is well-informed and remains interested.

Unfortunately, that cannot be said of any of the other candidates, despite the fact that the industry is absolutely vital to the country's economic growth. ▣

INTEGRATED SERVICES DIGITAL NETWORKS

CHARLIE BASS

ISDN's impact on LANs

The most commonly asked question regarding the relationship between Integrated Services Digital Networks and local-area networks seems to be, "Will ISDN put local-area networks out of business?" Local-net aficionados usually respond head-on with, "Of course not. We're not even in the same business."

While ISDN won't put local-area networks out of business, the transition of the telecommunications infrastructure to an all-digital standard will challenge many current assumptions about voice/data communications.

There's no question that ISDN will revitalize the position of private branch exchanges and central offices in data communications. Users accustomed to the restrictions of voice-grade circuits will have access to faster, cheaper and

Bass is cofounder and director of Ungermann-Bass, Inc., a local-area network vendor based in Santa Clara, Calif.

more reliable services through primary and basic rate interfaces.

Will this revitalization allow the PBX industry to capture more local data communications? Certainly. Does this revitalization represent a fundamental change in the applicability of PBXs vs. local nets? Certainly not.

Data communications is typically supported by one of two computing models. The traditional, prevalent model involves interaction between a remote user and a host processor. The user might be a terminal or an intelligent workstation in terminal-emulation mode. In each case, communications is supported by a circuit operating at modest data rates (less than 64K bit/sec).

The second, newer model involves multiple intelligent devices sharing information or resources through common servers. The communications requirements in this case may be circuit- or transaction- (datagram) oriented with high data rates (greater than 1M bit/

sec). In terms of circuit connectivity, potentially large numbers of circuits (greater than 1,000) need to be created and maintained through the network to each station (greater than 32) and server (greater than 128).

PBX-like switches are suitable for supporting the host computing model and will be increasingly competitive in this arena when upgraded to ISDN standards. In addition, the market will be stimulated simply by the existence of a data communications standard.

However, the server computing model is the native domain of local-area networks. Local-net technology was conceived to support this model. Current PBX architectures are not suited for this transaction-oriented, highly connected, high-speed environment.

Given this dichotomy of computing, the available market for PBXs and local-area networks depends on the prevalence of the respective computing models. While the host model is the older and prevalent

model of computing, the server model reflects the growing use of personal workstations and hierarchical networks. While both models will endure, the server model is emerging as the one more likely to dominate the market.

Accepting the future survival of local-area networks, how will ISDN affect their nature and use? First of all, there is some chance that ISDN's basic rate will replace RS-232 as the most commonly used serial interface. This argues for the existence of basic rate local-net servers to complement today's RS-

Struck by lightning in a brain storm? Discharge your ideas in a column for *Network World's* opinions pages. Manuscripts must be letter quality, double-spaced and approximately 600 to 750 words in length. Disk and modem submissions are preferred. Columns should be timely, controversial, literate and technically accurate.

Contact Steve Moore, features editor, *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700, ext. 732.

Opinions

► TELETOONS — By Phil Frank

Some people from
The American
Facsimile Association
are here to see
you..



STANDARDS ISSUES

STEVE ZAMIEROWSKI

RFPs key to open systems

Much has been written lately about vendor dominance in the Corporation for Open Systems (COS). Some users groups allege they have been purposely restricted, or at least delayed, from joining COS. Other, smaller users simply cannot afford the required commitment of money and time.

Either way, these users should not feel as though they have no say in COS activities and the evolution of Open Systems Interconnect (OSI) standards and testing. My advice to non-COS-member users is to speak softly and carry large requests for proposal.

Users can affect standards developments outside COS by cultivating close relationships with vendors. Ultimately, users have the power to influence standards evolution and COS activities by selecting vendors that can meet their communications needs and offer an integration path to open systems.

Some user companies maintain certified vendor lists, made up of vendors with demonstrated ability and commitment in offering and developing products that match the companies' specific needs. These users have adopted their own company standards from formal standards, de facto standards or products they feel best meet their needs.

OSI compatibility is usually included as a purchasing requirement, although this does not ensure interoperability. The company standards include things such as operating systems, data base management systems, query languages, personal computer software, and maintenance and support requirements. The lists are reviewed periodically, and vendors on the list are given priority status in the user's procurement process.

These procedures help motivate users and vendors to work together more closely on an ongoing basis. In many cases, vendors have modified or added to their product offerings so they support the internally adopted user "standards." Adding the

"OSI Seal of Approval" to the list sends the message to vendors that these users require COS's success.

This approach also focuses user energies on company needs. Users must identify their requirements and goals, develop a plan based on those goals and determine which systems need to communicate. They should be careful not to commit financial resources to OSI products where no real intercommunications need exists.

While users are looking out for their own best interests, vendors are doing the same. On one hand, vendors feel compelled by marketing conditions to offer a totally open system of communications. On the other hand, they have invested heavily in proprietary architectures they wish to protect because of the monetary investment and the competitive edge offered.

It is a good bet that proprietary network architectures will not completely disappear in the near future, if ever. In many observers' eyes, OSI's champagne glass logo has turned into a "Y," where vendor network architectures map to OSI at the bottom layers and then split at the top layers.

In evaluating vendor initiatives, we must remember that most vendors are adversaries. While all parties involved in COS have claimed that the cooperation level has been very high, one wonders how honest and effective the exchange of ideas can be in a room filled with friendly adversaries and their potential customers.

Users need not get involved with the vendors' inner struggle in the academic and bureaucratic COS environment. It is not imperative that each user join COS in order to influence the standards evolution. Some larger users will choose to join; others will not. And small users may not have the opportunity or desire to join.

Each potential customer does, however, have the power to focus its vendors' energies toward a testable open system of communications by demanding such solutions in their RFPs. Ultimately, most users will be more effective in fighting for standards on their own turf, face to face with vendors, rather than in the "neutral" arena of COS. □

232 terminal servers.

Similarly, ISDN's primary rate is likely to be the standard high-speed interface for connecting PBXs, local-area networks and CPUs in any combination. In particular, primary rate connections between PBXs and local networks will support a far more natural flow of data communications between these domains than has thus far existed.

Once local-area nets have incorporated basic and primary rate interfaces and have achieved efficient connectivity to the telecommunications world, more provocative scenarios can be imagined.

With a common interface to PBXs and local networks, users will be able to install a universal voice/data outlet in the wall, connect any compatible device to it and transparently utilize both PBX and local-net technology. This can be accomplished by forwarding traffic to the appropriate domain via a special purpose switch or at the interface to one of the two technologies.

Beyond this transparency at the wall outlet level is the potential blurring of local-area network/PBX functionality. The result of

incorporating ISDN compatibility into local network and PBX hardware and software, this combined functionality brings to the local-area network community the benefits of familiarity with telecommunications standards. These will enable local networks to connect directly to the local central office or long-distance carrier.

This is a strategically important position for vendor access to a customer establishment. The vendor that occupies such a position has influence on all on-premises services. This advantage will undoubtedly be contested by a number of vendors and service providers, including common carriers and Post, Telegraph and Telephone administrations.

To be fair to PBXs, arguments based on a traditional centralized architecture may be irrelevant, as distributed architectures and high-speed switching capabilities transform PBXs to look more and more like local-area networks. The inclusion of compressed voice traffic on local nets further blurs the distinction between PBXs and local nets to the point that it may not be possible to recognize just who is winning the battle for control of on-premises data communications. □

Zamierowski is client service manager for the Communications Industry Research Group of International Data Corp. in Framingham, Mass.

NETWORK WORLD**Features**

July 13, 1987

► *PROFILE*

A world of optiv

Chuck Garrison makes the networking decisions at the Chicago Board Options Exchange, one of the world's premier automated trading facilities.

BY MICHAEL FAHEY
Senior Writer

CHICAGO — On a typical business day, the floor of the Chicago Board Options Exchange (CBOE) is a madhouse of activity, as wildly gesturing traders frantically execute split-second deals.

The CBOE's 3-year-old granite-and-glass building houses what its management hails as the world's most sophisticated automated trading facility, handling more than 80% of the options traded in





PHOTO ©1987 GARY SIGMAN/BLACK STAR

the U.S. An option enables its purchaser to buy or sell a specified amount of securities at a stated price for a certain length of time.

Chuck Garrison, the CBOE's associate vice-president of telecommunications, oversees an eight-node, 4,000-line voice and data network that serves 1,350 information display terminals on the 43,000 sq. ft. CBOE trading floor.

The 100 million ft. of cabling that serve the trading floor's voice/data traffic generate so much heat that the building needs

no central heating plant. In fact, the building is air-conditioned year-round. The exchange also has more than a thousand specially designed exchange phones, made by Contel-IPC, a Contel Corp. subsidiary that produces equipment for traders.

Risky business

While the sophisticated computer and communications technology greatly facilitates trading, dependence on technology can be a double-edged sword. "If the tele-

phones go down, we will lose \$500,000 a minute until service is restored. Any interruption in the phone system is intolerable," says Garrison, the man entrusted with the job of seeing that the intolerable doesn't happen.

In addition to overseeing the CBOE's data and voice communications operations, Garrison has responsibility for the information display terminals and all of the exchange's electrical plant. A 14-year Bell System veteran, Garrison

Continued on next page

From previous page
joined the CBOE in August 1984, shortly before the exchange opened its new trading emporium. A friend recommended Garrison to the CBOE management, which was looking for someone to take charge of its communications system. Garrison, who was happy in his job at Illinois Bell, somewhat reluctantly agreed to an interview with CBOE executives. "They made me an offer I couldn't turn down, and I have been very happy in my three years here," he says.

Experience pays off

Garrison's entry into the telecommunications business was equally fortuitous. After serving for three years in the U.S. Marine Corps, where he studied and later taught electronics, Garrison returned to civilian life in need of a job. His future wife, Joan, was working for Illinois Bell and suggested that Garrison apply for a job there. Because of his electronics background in the Marines, Garrison was able to skip the customary entry-level positions with Illinois Bell and begin working as a technician in the telephone company's network-switching department.

Garrison earned undergraduate and master's degrees in business from Roosevelt University in Chicago while working for Illinois Bell, and he was placed in the com-

When repeated complaints to Rolm brought no satisfaction, Garrison began calling other Rolm users, who reported similar dissatisfaction with the switch-maker's response to customer complaints.

Garrison's contacts with the other users led to the formation of the National Rolm Users Group (NRUG). He is currently president of the group.

"The next time I had a problem

with one of our switches, the response was entirely different," Garrison recalls. "I received a call from [former Rolm President] Dennis Paboojian. I had the Rolm gurus camping out in my switch room until the problem was solved."

His initial unsatisfactory experience with Rolm gave the former Bell employee a sample of what it is like to be on the other side of the vendor-user relationship. "I realized what the term Bell-head really meant," Garrison says, referring to a term often used to describe Bell employees who are set in their ways. "When I was at Illinois Bell, we did think we knew what was best for the customers. When I was first dealing with Rolm, I got a taste of my own medicine."

"When I was at Illinois Bell," Garrison recalls, "we did think we knew what was best for the customers. When I was first dealing with Rolm, I got a taste of my own medicine."

"We are our own telephone company. Illinois Bell stops at the basement wall and everything else is ours, administrative and technical," Garrison explains.

pany's "fast track" management program. During his 14 years with the company, Garrison worked in a number of departments, including billing, rates and tariffs, repairs and marketing.

The thorough grounding he received in nearly all aspects of telecommunications has been invaluable in his current position with the CBOE. "We are our own telephone company. Illinois Bell stops at the basement wall and everything else is ours, administrative and technical," he explains.

The guts of the CBOE telecommunications operation are its eight Rolm Corp. VL Computerized Branch Exchanges (CBX). Shortly after Garrison went to work for the exchange, there were problems with one of the Rolm switches.

GO WITH THE WINNER!

Personal Earth StationTM

VSAT SATELLITE TELECOMMUNICATIONS SYSTEM

1987 PRODUCT OF THE YEAR

Computer Systems Category: ... For a product which provides a high-performance, low-cost, two-way data and telecommunications system for private or shared communications use.



The American Federation of Information Processing Societies held its annual Product of the Year Awards, sponsored by FORTUNE magazine, in Chicago on June 16, 1987 during the National Computer Conference. The AFIPS Awards are presented to companies in recognition of the beneficial impact that innovative and commercially viable products have had on the United States. The awards are selected based upon the reviews of AFIPS appointed panels of experts.

MACOM
Telecommunications

The soft-spoken Garrison discusses his early problems without rancor and expresses satisfaction in the fact that NRUG has smoothed users' relationships with Rolm. He is concerned, however, that recent moves by IBM to take tighter control of its switch manufacturing subsidiary will adversely affect user-vendor relations. "I was a large Rolm user," he says. "I will not have the same stature with IBM."

IBM alliances

Not one to sit back and simply worry about a potential problem, Garrison and his fellow NRUG officers have already made alliances with the IBM users groups, SHARE and GUIDE, in an effort to increase

their leverage with Big Blue.

Since the CBOE is, in effect, a club designed to provide trading facilities for its members, Garrison's mandate is to provide communications services as cheaply

and reliably as possible. Members pay for their communications expenses partially through their annual fees.

In addition, Garrison simply passes back, without a markup,

Since the CBOE is, in effect, a club designed to provide trading facilities for its members, Garrison's mandate is to provide communications services as cheaply and reliably as possible.

many of the communications expenses incurred by exchange members. "Our objective," Garrison says, "is to make communications state-of-the-art and to be able to provide it to the member firms at a very attractive price."

In some cases, exchange members contract with outside vendors for communications products and services, and members of Garrison's staff act as consultants to the traders. In addition, Garrison has contracted with Illinois Bell and other carriers to have emergency circuits on hot standby in case traders lose their communications.

Despite the size of his operation, which includes some 1,000 private lines, Garrison is not considered a large private-line user because many of the private lines for which he has responsibility are leased from carriers by exchange members.

Because 75% of the traders' private lines run between Chicago and Manhattan, Garrison is pursuing a plan to bypass New York Telephone Co., which he says is woefully slow in installing local circuits.

The CBOE, the Chicago Board of Trade and the Chicago Mercantile Exchange have a fiber loop that bypasses Illinois Bell. In addition, Garrison arranged to have CBOE facilities that use the local exchange switched through a number of central offices as a backup pro-

"With \$70 billion in trading going on in a year, the traders can be somewhat, shall we say, hyperactive, if there are problems," Garrison says with a smile.

cedure in case of central-office failure. "With \$70 billion in trading going on in a year, the traders can be somewhat, shall we say, hyperactive, if there are problems," Garrison says with a smile.

Sometimes Garrison has to anticipate the needs of the CBOE members. When the exchange recently opened a currency option operation, Garrison knew that many members would participate, but he also knew that most would wait until the last minute to secure the necessary telecommunications circuits. So, Garrison went ahead and ordered a T-1 line and had plenty of telephone circuits available when the procrastinating traders committed themselves to the currency operation.

Continued on next page



SALES OFFICES, United States: Germantown, Maryland (301) 428-7155; Houston, Texas (713) 580-8053; Northbrook, Illinois (312) 498-0900; San Diego, California (619) 453-7007; (800) 626-6640 (Toll free except in California); San Francisco, California (415) 362-1153; Woodbridge, New Jersey (201) 636-8190; International: Germantown, Maryland, USA (301) 428-5604; Milton Keynes, England (0908) 661 966; Roma, Italy (06) 360 6659; Paris, France (1) 4554 9758; Feldkirchen, West Germany (89) 903 8034; Crows Nest, NSW, Australia (02) 438 1299; Hong Kong (05) 263362.

From previous page

Despite his reference to "Bell-heads," Garrison says he greatly values his experience with Illinois Bell, adding that one job in particular with the company helped prepare him for dealing with demanding users. When he was managing a repair center serving Chicago's affluent north side residential area along the shore of Lake Michigan, he regularly received calls from irate customers invoking the name of their friend Charles Brown, current AT&T chairman and at that time, president of Illinois Bell.

One particularly indignant woman called because one of the 26 phone jacks in her spacious North Shore home, the one closest to the

spot where her husband liked to read his evening paper, was not working. "She said, 'Young man, if someone isn't out here in a half hour, my husband will call Charley Brown in the morning,'" recalls

Garrison, adding that such threats from the posh North Shore were not to be taken lightly.

One way that Garrison has met the needs of his users is by assembling a crack staff of about 30 peo-

One way that Garrison has met the needs of his users is by assembling a crack staff of about 30 people. "If you want to have the best service, you have to have the best people," he says.

ple. "If you want to have the best service, you have to have the best people," says Garrison, as he guides a visitor through a basement beneath the trading floor.

"I've had the privilege of hiring my own staff," Garrison says. "I went out and got the experts. My data guy, Frank Romer, has 20 years of experience with AT&T. My network switch man, John Gacek, has AT&T experience and worked for IPC. Lynn Finnegan, who works for Gacek, was hired away from Rolm, where she worked for seven years. John Turek, who takes care of the electrical plant, reports to me, and I hired him away from the engineering group that built the building. In my opinion, I went out and got the best."

Because Chicago is a secondary trading market, Garrison says, "If we go down, New York will keep operating, and the traders could be wiped out. I have to go out and get the best."

Service with a savings

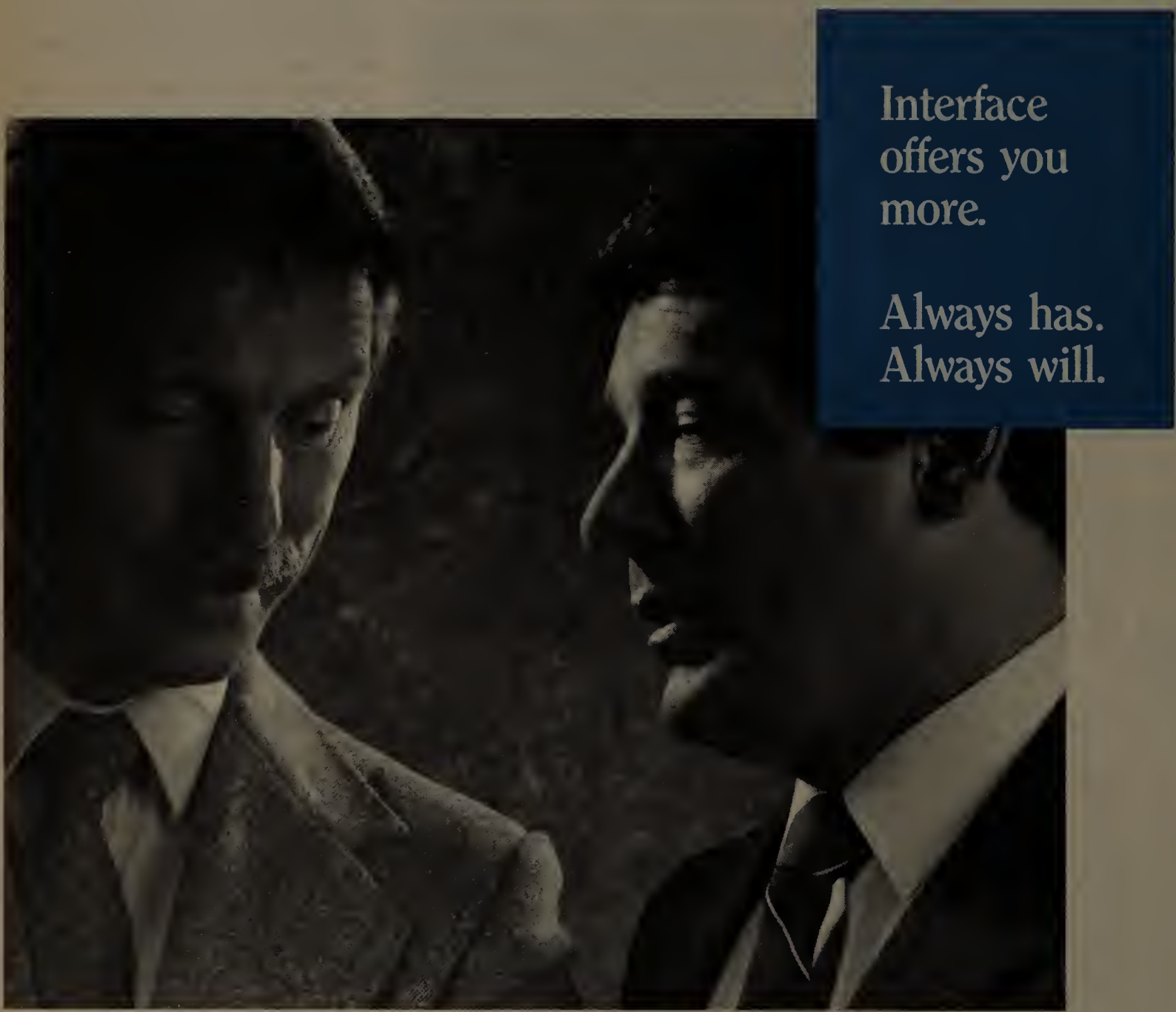
A recent internal audit praised Garrison and his staff for providing quality service while saving the traders money. "We got our average cost-per-call down from 42 cents per minute to 22 cents per minute," Garrison says. "I took great satisfaction in having the internal auditor say that we were doing a tremendous job in saving the

Because Chicago is a secondary trading market, Garrison says, "If we go down, New York will keep operating, and the traders could be wiped out. I have to go out and get the best."

traders money."

While the Zion, Ill., resident appears to have plenty to occupy his time and attention, Garrison is looking forward to overseeing the installation and operation of the communications equipment for the CBOE's second trading floor, which will be completed in two years.

"It will be a great challenge," says Garrison. "Just to open it up will cost \$30 million, and my end — communication and electrical — will account for \$10 million. We are, of course, a very communications-intensive operation, but many other businesses are heading in that direction. The old days of just calling up the telephone company are over. Telecommunications is a great field." □



Interface
offers you
more.

Always has.
Always will.

Interface '88 will attract the most qualified attendees of any communications and networking show in the world! Because for the sixteenth consecutive year, Interface will offer them *more...*

More exhibitors than any other show in the industry! *More* conferences, with *more* leading presenters than any other communications/networking event! *More* new product introductions than any other industry forum! *More* opportunity to find solutions to their growing challenges!

For your company, that means *more* opportunity to meet and sell to the executives who plan, purchase and manage sophisticated communications and information networking systems for their organizations!

Interface '88 will be held in Chicago, one of the nation's most concentrated business centers. Offering easy access from around the world for professionals who rely on Interface for the products, information and ideas they need to succeed.

And since Interface '88 will be held concurrently with the first World Congress on Computing, you'll gain even greater opportunity for industry-wide marketing impact.

Join hundreds of leading manufacturers who have already reserved their exhibit positions. Call Interface '88 Exhibit Sales today at (617) 449-6600, Ext. 4013.

INTERFACE'88

March 28-31, 1988 • McCormick Place • Chicago, Illinois

Co-sponsored by
BusinessWeek and **Data Communications** Magazines

I'm ready for more at Interface '88!

- ☐ Send me complete exhibitor kit, including brochure, floorplan and contracts.
- ☐ Have a Sales Representative call me immediately!
- ☐ Send me a profile of Interface '87 attendees.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone (_____) _____

Return to: Interface '88, The Interface Group, 300 First Avenue, Needham, MA 02194
Or call (617) 449-6600, ext. 4013.

Qualification Form for Free Subscriptions.

Please answer ALL QUESTIONS, sign and date the card.

Free subscriptions will be accepted only from individuals in the U.S. and Canada with active professional or managerial responsibilities in communications. The publisher reserves the right to limit the number of free subscriptions accepted in any business category. To qualify, you must answer all the questions below completely, **sign and date this form**.

If address has changed, attach mailing label with old address here.

☐ Address Change ☐ New subscription

First Name	Middle Initial	Last Name
Your Title		
Company Name		
Div. Dept.		
Street Address		
City	State	Zip Code

Is the above your home address? ☐ Yes ☐ No

I wish to receive a subscription to *Network World*: ☐ Yes ☐ No

Signature _____

Title _____ Date _____

Business Phone (_____) _____

PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.

- 1
- My primary areas of activity. (Circle ONE only)
- I am involved in evaluating communications (data, voice and/or image) products and services:
1. for use within my own company/organization

2. for resale to other companies/organizations

3. Both

4. Other (explain) _____

1a

For communications, my primary responsibility is: (Circle ONE only)

1. Data Communications

2. Voice Communications

3. Both

4. Other (explain) _____

2

Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications

21. Management

VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development

22. Supervisory/Staff:

Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management

VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development

32. Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications

41. Management

42. Supervisory/Staff

MIS/Data Processing

51. Management

VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation

52. Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications

Others

75. Consultant

80. Educator

85. Financial Analyst

90. Marketing/Sales

95. Other _____

- 3
- Job Function
- Which one of the following best describes your functional involvement with communications (data, voice, and /or video) products? (Circle ONE only)
- Corporate

1. Business Management, Planning and/or Development

Communications System/Network

2. Management, Planning and/or Development

3. Implementation and/or Operation

4. Other _____

4

Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)

Consultants

11. DP/Communications Consulting Services

12. Consulting Services (except DP/ Communications)

End Users

13. Manufacturer (other than computer/communications)

22. Finance/Banking/Insurance/Real Estate

23. Education

24. Medicine/Law

25. Wholesale/Retail Trade

26. Public Utility/Transportation

27. Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry

28. Business Services (excluding DP/Communications)

29. Government: Federal

30. Government: State/Local

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers

42. Interconnect

43. Manufacturer Computer/Communications Equipment

44. Value Added Reseller (VAR), Systems House, Systems Integrator

45. Distributor

46. DP/Communications Services (excluding consulting)

95. Other _____

5

In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)

1. Recommend/Specify

2. Identify/Evaluate Potential Vendors

3. Approve the Acquisition

4. None of the Above

6

Check ALL that apply in columns A and B.

A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

B. These products and services are presently in use at this location:

A

B

Product/Services

Computers

01. ☐ ☐ Micros

02. ☐ ☐ Minis

03. ☐ ☐ Mainframes

34. ☐ ☐ Printers

Data Communications

04. ☐ ☐ Communications Processors

05. ☐ ☐ Comm./Networks Software

06. ☐ ☐ Digital Switching Equipment

07. ☐ ☐ Facsimile

08. ☐ ☐ Modems

09. ☐ ☐ Multiplexers

10. ☐ ☐ Protocol Converters

11. ☐ ☐ Network Mgmt. & Control

12. ☐ ☐ Test Equipment

13. ☐ ☐ 3270 Controllers

35. ☐ ☐ Intelligent Terminals

Telecommunications

14. ☐ ☐ PBXs

15. ☐ ☐ Key Systems

16. ☐ ☐ Central Office Equipment

17. ☐ ☐ Integrated Voice/Data Terminals

A

B

Product/Services

Transmission/Network Services Equipment

18. ☐ ☐ Microwave

19. ☐ ☐ Satellite Earth Stations

20. ☐ ☐ Local Area Networks

21. ☐ ☐ Wide Area Networks

22. ☐ ☐ Packet Switching Equipment

23. ☐ ☐ Fiber Optic Equipment

36. ☐ ☐ T1

Communications Services

24. ☐ ☐ Packet Switching Services

25. ☐ ☐ Cellular Mobile Radio Services

26. ☐ ☐ Electronic Mail

27. ☐ ☐ Enhanced Services

28. ☐ ☐ Centrex

29. ☐ ☐ Long Haul Services

30. ☐ ☐ BOC Services

31. ☐ ☐ Independent Telco Services

Other

32. ☐ ☐ Factory Communications

33. ☐ ☐ Online Data Bases

7

Estimated value of communications systems, equipment and services:

A. which you helped specify, recommend or approve in last 12 months?

(Check only ONE in column A.)

B. which you plan to specify, recommend or approve in next 12 months?

(Check only ONE in column B.)

A

B

1. ☐ ☐ \$10 million and over

2. ☐ ☐ \$5 million - \$9.9 million

3. ☐ ☐ \$1 million - \$4.9 million

4. ☐ ☐ \$500,000 - \$999,999

5. ☐ ☐ \$250,000 - \$499,999

A

B

6. ☐ ☐ \$100,000 - \$249,999

7. ☐ ☐ \$50,000 - \$99,999

8. ☐ ☐ Under \$50,000

9. ☐ ☐ Don't Know

8

Estimated gross annual revenues for your entire company/institution:

(Circle ONE only)

1. Over \$1 billion

2. \$500 million to \$1 billion

3. \$100 million to \$499.9 million

4. \$50 million to \$99.9 million

5. \$10 million to \$49.9 million

6. \$5 million to \$9.9 million

7. under \$5 million

9

Estimated number of total employees at this location:

(Circle ONE only)

1. Over 5,000

2. 1,000 - 4,999

3. 500 - 999

4. 250 - 499

5. 100 - 249

6. 50 - 99

7. 20 - 49

8. 1 - 19



P.O. BOX 1021
SOUTHEASTERN, PA 19398-9979



PLACE
POSTAGE
STAMP
HERE

▲
FOLD HERE AND MAIL TODAY

STOP. Did you do the following:

1. Supply old and new address if address has changed
2. Answer all questions
3. Sign and date form

Enclosed is my:

- ☐ Address change.
- ☐ New subscription request.

THANK YOU.



PLEASE TAPE HERE
▲

Product Focus: VSAT services

When movers get shaky

A lack of user success stories may keep the VSAT market in the doldrums.

Continued from page 1

With the pressure on in the race to gain market share, many vendors have found their performance lagging behind expectations. AT&T has been forced to make several pit stops since introducing its Skynet Star Network Service and is still reworking the offering. Tymnet/McDonnell Douglas Network Systems Co.'s Tymstar VSAT offering is currently in the pit area and won't be reintroduced for 30 to 60 days.

Telecom General Corp.'s entry in the VSAT race crashed early in the competition. The San Jose, Calif.-based firm closed shop earlier this year due to a variety of problems, including management upheaval and network software difficulties.

MCI Communications Corp. decided in February to drop its VSAT service, dubbed Bits 100, according to the carrier's former director of satellite programs, Bud Morgan. A last-ditch attempt to offer the VSAT service via a start-up

firm was aborted shortly thereafter.

Even pole position holder Equatorial Communications, which sold more VSAT networks than all of

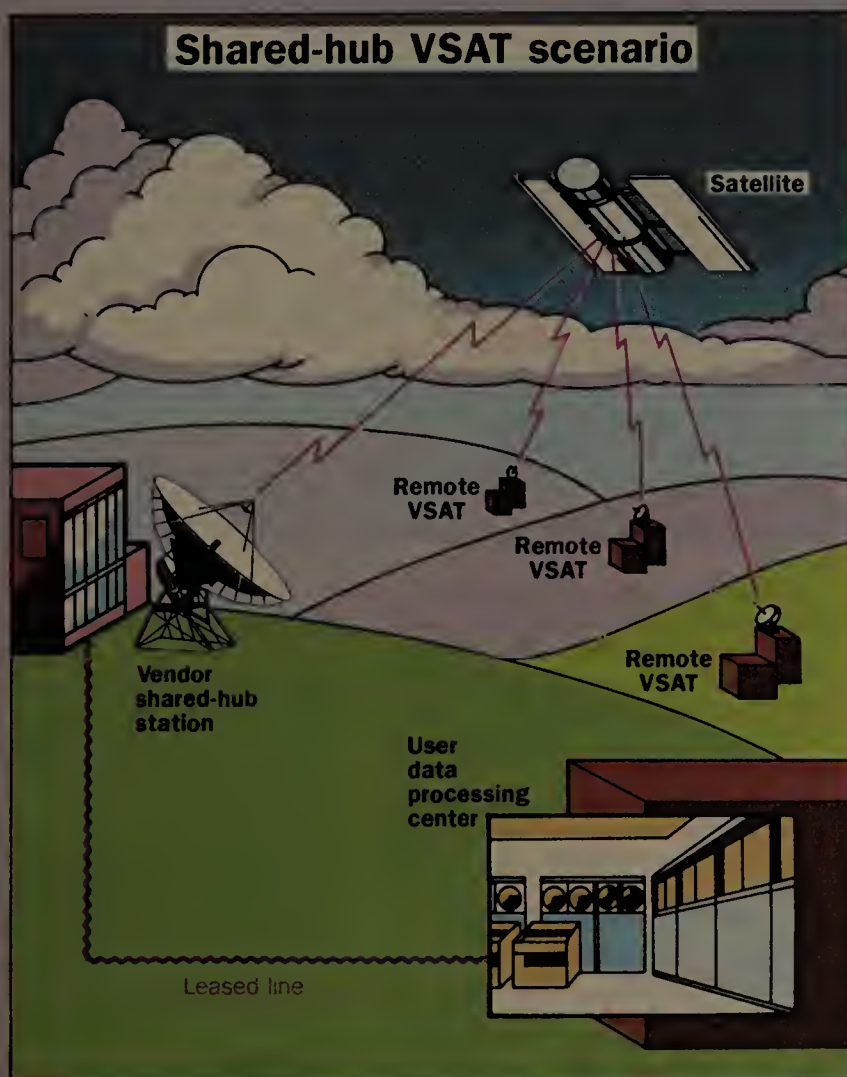
its competitors combined, posted a \$3.31 million loss for the first quarter of 1987. The loss followed a year in which user companies of all sizes with all

types of wide-area networking needs seemed to flock to VSAT services like race fans to the Indianapolis 500.

In addition, the sale of M/A-Com's Telecommunications Division to Hughes Communications will add a new dimension to M/A-Com's VSAT offering, which previously comprised small earth stations as well as installation and support services. Teamed with Hughes Communications, M/A-Com could become one of the few firms capable of offering equipment, support and transponder space, obviating the need for the vendor to subcontract this work to third parties.

The first contingent of VSAT pioneers departed terrestrial networking in 1985. And as of early 1987, most of these users had not yet reported back on their progress. Although the first large VSAT networks have yet to be fully implemented, vendors say there is a critical need for user success stories, which might serve to attract hesitant users to these small

Continued on next page



From previous page
earth-station services.

Users still attracted

Despite these satellite networking dilemmas, users are still opting for VSAT networks, albeit at a far slower pace than in 1986. One user beginning a VSAT venture this year is Prudential-Bache Securities, Inc., which plans to create a 300-site network

to handle data, teleconferencing and broadcast video applications from the firm's New York headquarters to its branch office sites.

S&L Data Corp., Inc. provides communications services to the 200 financial institutions that own it. The firm chose Equatorial to assemble a 15-state VSAT network that will likely serve most of the

company's member institutions.

Equatorial and Telenet Communications Corp. joined forces to provide the U.S. Department of Agriculture with a 280-site VSAT network for its Forest Service. In all three of the above cases, replacement of costly leased lines was a key reason for opting to go with satellite networks.

The VSAT industry has suffered silently since late 1986. The unavailability of satellite launch craft publicized in the wake of the Space Shuttle Challenger explosion early last year obscured the actual state of the industry. Joe Rinde, director of product marketing for Equatorial, admits there is currently a transponder glut. An excess of of satellite transponders

represents Equatorial's largest financial liability to date, he says.

VSAT network vendors are finding it difficult to translate pilot customers to private network owners. Many users have chosen to test the wide-area net technology by setting small networks that Equatorial's Rinde says typically run from 30 to 90 days. Some pilot users become VSAT net users, but many are simply the telecommunications equivalent of tire kickers.

The pilot test — which enables users to evaluate small earth station technology with specific applications in mind — poses problems for vendors because it extends sales cycles. It also ties up valuable resources with users that may only be checking out VSAT nets because one of their competitors is giving them a look. But user interest, whether sincere or fleeting, does exist. Vendors say that for every VSAT network user, there are several users piloting test nets.

More great shakes

Because few vendors have been able to put together a long list of VSAT network users, the industry shakeout will likely intensify. With the exception of Equatorial, which began offering VSAT services before many of its competitors, most vendors have signed fewer than a half-dozen users to two-way network arrangements.

Phil Arst, a consultant with Communications Strategies Associates, Inc., a Saratoga, Calif.-based communications consulting firm, says VSAT vendors that wish to survive the current squeeze must go beyond selling their networks on price alone. "Users want a vendor with strong troubleshooting capability and with financial stability," he says.

Arst, a former marketing manager for Equatorial, predicts equipment suppliers will continue to team up with satellite transponder space providers, as GTE Spacenet Corp. did with Tridom Corp. on the Prudential-Bache contract. Other suppliers may be acquired by satellite service providers, as Hughes Communications has done with M/A-Com's Telecommunications Division, Arst says.

One vendor, Charles Kenmore, vice-president and general manager of shared network services for CTP, predicts the industry shakeout will continue. "There will be further con-



WHEN EARTH-BOUND COMMUNICATIONS TIE YOUR COMPANY DOWN, LOOK TO THE SKIES

Companies across America have discovered the cost savings that Harris satellite communications offer over traditional leased lines. And by installing private networks, top corporate managers are making their communications systems serve their needs . . . not an outsider's!

Performance, reliability, and customer support have long made Harris the leader among the installed user base of point-to-point networks. Now Harris offers PACTnet, our advanced VSAT point-to-multipoint system.

PACTnet combines Ku-band transmissions and VSAT technology to make private communications networks practical and affordable for companies with multiple remote sites. Predictable sav-

ings. Complete network control. Simple, quick relocations. You get them all. And when it comes to uptime, PACTnet beats terrestrial lines hands down.

What's more, we've joined forces with AT&T, the world's communications leader, to support its SKYNET® Star Network Service.

Free your company from Earth-bound communications today . . . with Harris VSATs and AT&T full service. To find out more, call TOLL FREE:

1-800-4-Harris, ext. 3310.

 **HARRIS**

Two-way VSAT services

Vendor High end (networks of more than 100 VSATs)	Service name	Shared or private hub station	Shared hubs		Vendor providing VSATs	Vendor providing transponder space	Vendor providing net management and control	Vendor handling network installation	Handling of landlord and zoning issues	VSAT size (meters)	Data protocols supported	Ku- or C- band usage
			Number	Location								
American Astronet Charlotte, N.C.	Resells CTP service	shared	1	Charlotte, N.C.	CTP	RCA American	Telecommunications Enterprises, Inc. (TEI)	TEI	Will assist user	1.8	SNA/SDLC, X.25, bisynchronous	Ku
AT&T New York	Skynet Star Network Service	both	1	Manhattan, N.Y.	Harris Corp.	RCA American	AT&T	AT&T	Will assist user, or provide as optional service	1.8	SNA/SDLC, X.25, BSC, asynchronous, Digital Equipment Corp. DCMP, Unisys Poll/Select	Ku
COMSAT Technology Products, Inc. (CTP) Clarksburg, Md. □	Starcom Data Service	shared	1	Washington, D.C.	CTP	Contel ASC	CTP	CTP or third party	Will handle if specified in RFP	1.2, 1.8	SNA/SDLC, X.25	Ku
	Starcom Network Service	private										
Contel ASC Rockville, Md.	Small Station Service	both	1	New York (5 others planned)	CTP, Equatorial	Contel ASC	Contel ASC	Contel ASC	Will assist user	1.8	CTP Dish: SNA/SDLC; Equatorial Dish: SNA/SDLC, X.25, BSC 3270, asynchronous, Unisys Poll/Select	Ku
Equatorial Communications Co. Mountain View, Calif. □□	Equastar Transaction Network Service	both	1	Mountain View, Calif.	Equatorial	Equatorial- owned transponders	Equatorial	Equatorial	Will assist user	1.2	SNA/SDLC, X.25, BSC, asynchronous, Unisys Poll/Select	C
GTE Spacenet Corp. McLean, Va.	Skystar Interactive Network Data Service	both	3	New York, Chicago, Los Angeles	NEC America, Inc., Tridom Corp., Harris	GTE Spacenet	Telenet Communications Corp. or other vendor	Mosler, Inc. and/or GTE Spacenet	Will assist user	1.8	SNA/SDLC, X.25, asynchronous, bisynchronous	Ku
RCA American Communications, Inc. Princeton, N.J.	Microstar	both	0		NEC America, Avantek, Inc.	RCA American	RCA American	RCA American or third party	Will assist user	1.8	Contact vendor	Ku
Low end (networks of fewer than 100 VSATs)												
Nova-Net Communications, Inc. Englewood, Colo.	Resells Equatorial service	shared	1	Mountain View (owned by Equatorial)	Equatorial	Equatorial	Nova-Net	Will install first group and train users to do rest, or third party	Will assist user, or optional service available	1.2	SDLC, X.25	C
Skyswitch Satellite Communications Co. Golden, Colo.	None	Uses VSAT-to- VSAT design, no hub needed	NA		Several individual vendors	GTE Spacenet (primary) or others	Will train user	Skyswitch	Will assist user	1.8	X.25	C, Ku

□ Purchased by Contel ASC on July 3 (see text)

□ To be purchased by Contel ASC, pending Equatorial shareholder and regulatory approval (see text)

BSC = Binary Synchronous Communications
HDLC = High Level Data Link Control
NA = Not applicable

SDLC = Synchronous Data Link Control
SNA = Systems Network Architecture

SOURCE: NETWORK WORLD

solidation of the VSAT market," he says, "with the smaller players filtering out of the industry."

A former chief executive officer of a satellite networking vendor, who requested anonymity, says the future for small VSAT service providers isn't bright. "This industry is no place for small companies," he states.

Kenmore says the allure of VSAT technology, envisioned as a replacement for leased-line networks, hasn't faded. "Users want end-to-end digital service." He says the cost of the long-distance carrier point of presence-to-customer premises segment of a long-distance link has risen markedly during the past two years.

Kenmore adds that VSATs can be installed faster than leased lines. "Predicting the installation of leased lines is an imprecise art. A VSAT, however, can be installed anywhere in the U.S. within 30 days," he says.

The complete vendor

Possibly more difficult than predicting the outcome of the VSAT industry's musical chairs tournament is determining which vendors provide all parts of a VSAT service and which offer only segments. This differentiation is particularly important in light of users' desire for one-stop shopping for communications services, equipment and support.

Although several companies offer a single point of contact for all parts of the service, few actually own the transponder space, manufacture the VSATs and operate national field service organizations.

Last year's K mart Corp. VSAT network contract is an example of such a situation. GTE Spacenet served as the single point of contact and transponder space supplier; NEC America, Inc. supplied the small earth stations; and GTE Spacenet contracted with Mosler, Inc. of Hamilton, Ohio, to assist in providing maintenance for GTE Spacenet's VSATs. Telenet provided a network communications center for this massive VSAT undertaking.

AT&T, CTP and RCA American Communications, Inc. also conduct business in the same manner.

Equatorial, Contel ASC and Hughes Communications-M/A-Com Telecommunications Division are examples of vendors that are, or will be, pitching single-vendor solutions. M/A-Com's Telecommunications Division, Tridom, NEC America and Scientific-Atlanta, Inc. are primarily equipment suppliers.

These vendors help coordinate the acquisition of satellite transponder space at the user's request.

Yet others, such as American Astronet of Charlotte, N.C., have chosen to resell the services of

larger vendors, in this case, CTP.

Two-way VSAT networks aren't reserved just for medium and large corporations. Over the past year, several low-end small earth station network service providers have cropped up. These companies, which include Nova-Net Communications, Inc. of Englewood, Colo., have had much success in the under 100-VSAT network. Nova-Net currently provides small VSAT nets to more than a half-dozen pipeline companies for Supervisory Control and Data Acquisition applications.

Many small users looking for "mesh" VSAT systems — nets without hub stations that allow direct VSAT-to-VSAT data and voice transmission — have already signed on with Skyswitch Satellite Communications Co. of Golden, Colo.

While the majority of VSAT service providers solve the problem of linking remote terminals to hosts in data processing center applications, Vitalink Communications Corp. has been pitching its Satlan service, which connects remote local-area networks over satellites.

Satlan Product Manager Gary Van Buskirk says 1.8-meter Ku-band VSATs are used in this wide-area networking service. The lack of VSAT net user success stories, he claims, has hurt Satlan, as well as terminal-to-host VSAT network services. Van Buskirk says the

company's VSATs are more expensive than those of its competitors, but its hub stations are far less expensive than those used in mainstream VSAT nets.

Private VSATs

Users have the option of purchasing a private VSAT network and operating and maintaining the system themselves or subscribing to a shared VSAT service. The majority of VSAT systems are shared — meaning multiple users share a single hub that serves as the center of the VSAT net.

Few users have opted to buy private networks because the one-time capital investment is staggering. The hub station alone, depending on the size of the dish and complexity of network control and management systems, can exceed \$1 million. Niagara Mohawk Power Corp. and Southland Corp. are among the small group of users that have chosen a private network.

Users should note the location of their VSAT service vendor's shared hub station because they may have to run at least one leased line from their corporate headquarters or data center to this hub. Equatorial's only shared hub is located in Mountain View, Calif., while CTP's shared hub is in Washington, D.C.

Contel ASC, which purchased

Continued on next page

Equatorial adds VSAT mart power

continued from page 1

gust 1986, proposed purchasing the 24% of Equatorial owned by Martin Marietta Corp. and outstanding company stock.

In a separate but related deal, Contel ASC agreed to acquire for \$38 million the VSAT network operations of COMSAT Technology Products, Inc. (CTP) and the international private network business of COMSAT International Communications, Inc. Although it is unclear how Contel will wed the VSAT components it intends to acquire, Contel ASC President George Roberts said CTP will continue to offer Ku-band VSAT service for high-speed data applications and Equatorial will provide C-band low-speed data services. "We will obviously structure the organization so that CTP and Equatorial will not compete with one another."

Consummation of the Contel ASC-Equatorial purchase is subject to the agreement of Equatorial's major creditors and a majority of its stockholders, the negotiation and execution of a definitive agreement, and approval of the agreement by both companies' boards of directors. The acquisition must also be approved by the Federal

Communications Commission, the Justice Department and the Securities and Exchange Commission.

If the acquisition is approved, Contel ASC will pay Martin Marietta \$12.6 million in cash and two promissory notes, one for \$1.8 million and one for \$12.6 million. Payment of the second note is contingent upon Martin Marietta's purchase of \$45 million in services from Contel ASC over a 10-year period. Contel ASC will also pay Equatorial shareholders \$4 per share of stock.

Equatorial reported a \$3.31 million loss for the first quarter of 1987 and a \$67.8 million loss for 1986. The vendor claims the bulk of its financial problems stem from costly transponder lease payments.

VSAT industry analysts maintain that Contel's aggressive acquisition program will position Contel ASC as the most diversified provider of VSAT nets.

Bill Rahe, a former American Satellite Co. market planner who is currently vice-president of Enterprise Network Strategy for Gartner Group, Inc., a Stamford, Conn.-based consulting firm, predicted Contel ASC could become the VSAT team to beat. "These ac-

quisitions will make Contel ASC the leader of the VSAT industry," Rahe maintained. "Users were leery of Equatorial's financial problems, but with Contel's support, the black cloud over Equatorial will disappear."

Roberts explained the company plans to locate shared network hub stations in several cities across the nation. Each hub site will be equipped with a CTP Ku-band mas-

Although it is unclear how Contel will wed the VSAT components it intends to acquire, Contel ASC President George Roberts said CTP will continue to offer Ku-band VSAT service for high-speed data applications and Equatorial will provide C-band low-speed data services.

ter station and an Equatorial C-band hub. Hubs will be tied together with fiber-optic cable. A Contel ASC spokesman said all hardware is expected to be installed over the next year.

Roberts said internal studies and market research conducted by outside firms indicate there is adequate demand for VSAT services to

justify the vendor's project. The company's internal study concluded the market for VSATs would range from 200,000 to 400,000 dishes per year by 1990, Roberts added. "We think the market is there. User demand is growing, and it will continue to develop."

According to one industry watcher, Phil Arst, former director of marketing for Equatorial and now a consultant with Communications Strategies Associates, Inc., "There is certainly not enough user interest right now. But user demand for VSAT services will, over time, build to the level Contel ASC needs."

"We think that by offering both low-speed and high-speed VSAT networks, we will be head and shoulders above our competitors," Roberts said. "By offering a shared hub service, we will be able to attract small users with 50-site networks while also handling large VSAT nets."

Arst predicted Contel ASC's commitment to the VSAT market will help build confidence in the industry. "Users saw Equatorial, the industry leader, in serious financial straits. They will feel much better seeing Contel, a huge telecommunications vendor, providing a variety of VSAT services," Arst said. ▢

When movers get shaky

continued from page 35

several million dollars worth of VSATs and hub stations from Equatorial earlier this year, may have a solution for users scanning the horizon for nearby hubs.

The company plans to locate five hub stations across the nation. Each would be tied to at least one other station via fiber-optic cable. This would provide VSAT network users regional access to a Contel ASC hub.

CTP's Kenmore says the amount of capital required to purchase a hub station and the necessary VSATs for the planned network are the single biggest impediments to sales of private systems.

"Even if the VSAT system will reduce the user's communications expenses by 30% and freeze the cost of communications over a five-year period, users don't want to spend capital to save money," he explains. "This type of network purchase generally requires approval from the user company's top management."

Whether the VSAT network uses a shared hub or a private one, users should press vendors to determine what level of support, if any, they will receive if they encounter problems with a landlord or with local zoning. Equatorial's Rinde says these roadblocks to VSAT installation are the single biggest barrier to installing satellite networks.

VSAT users who don't own their buildings must gain landlord approval to plunk a VSAT on the roof or bolt one to the side of the structure. Local zoning restrictions may

also present problems for users. Most vendors will support users in these situations, usually by providing any documentation required to assuage the fears of building owners and to address local planning and zoning boards.

"We expect the customer to be the point man, but we will provide them with all the ammunition they need," Rinde says. Contel ASC Marketing Vice-President Jim Sobczak says the vendor will handle these problems if it is stipulated in the user's VSAT net request for proposal.

Users must also deal with the need for a clear line of sight between the VSAT and the satellite at each location. Although this may seem to apply only to microwave and infrared systems, vendors claim it's another pesky issue that must be considered when installing a VSAT net.

Finally, maintenance and continuing field support should not be overlooked when selecting a VSAT network. Users have the choice of purchasing equipment and service from vendors that maintain national field forces or from vendors that will subcontract the work to a third party.

Each approach has its merits. A VSAT vendor's own support contingent may be more familiar with the vendor's product, while a third-party group may possess a more diversified knowledge of VSAT maintenance.

Users watching the VSAT race from the stands will likely see several entrants crash or fail to re-emerge from the pit area. Therefore, those users may want to think twice about a VSAT vendor's standing before making any long-term contracts. ▢

Northern braces CO switch

continued from page 2

installing a new system bus, the PBX can be enhanced to handle multiple applications in addition to its function as a digital switch.

Although DMS-Supernode will be capable of processing twice the maximum number of telephone calls as a DMS-100 — 600,000 vs. 300,000 — applying the technology to the SL-100 will improve only networking capabilities, not line capacity.

The enhanced SL-100 will eventually offer users with private networks the same capabilities DMS-Supernode offers telephone companies. These include the ability to support ISDN-type services, including identifying calling parties, retrieving calling parties' numbers when phones cannot be answered and identifying the number of the last calling party when the phone was unattended.

Bill Young, director of product management-networks with Northern Telecom's Data Communications and Networks Group, said there is more than sufficient user demand for SL-100s with the power offered by the DMS-Supernode. "There are definitely private communications network applications and requirements for SL-100s equipped this way," Young said.

SL-100s fitted with the DMS-Supernode hardware and software would provide users with greater flexibility in running power-greedy applications, he said. "The SL-100 could, for example, run a large [automatic call distribution] application, while simultaneously serving as a major network node and offering full digital PBX func-

tionality," Young said.

Equipping an SL-100 with DMS-Supernode capabilities would also enable a large private network user to administer telephone station moves, adds and changes without the assistance of a Bell operating company technician, Young said. Many users have opted for private networks either to control or reduce these service costs, which vary by state.

Young said use of an SL-100 with the necessary DMS-Supernode enhancements would also facilitate reconfiguration of private network transmission links in the event of line outages and other unexpected network nightmares.

DMS-Supernode features on the SL-100 PBX will become widely available beginning in 1989, Young predicted. The switch maker said a total of 165 SL-100s, representing roughly 850,000 lines, are currently installed or on order.

One industry watcher, Doane Perry, a senior analyst with International Data Corp., a Framingham, Mass.-based communications research firm, said the introduction of the DMS-Supernode may allow Northern Telecom to close the gap between itself and central office switch sales front-runner AT&T. "AT&T has a slight edge in this market, but Northern Telecom's aggressive product strategy may allow it to draw closer to AT&T," Perry said.

Northern Telecom said it has already racked up orders for 200 DMS-Supernodes for delivery in 1988 and predicted this number will reach 300 by year's end. Each system costs \$250,000 to \$300,000, the vendor noted. Northern Telecom began shipments of DMS-Supernode earlier this month. ▢

COMMUNICATIONS
MARKETPLACE

MULTILINE



\$99
PER
LINE

**BULLETIN BOARD
INFORMATION HOST SYSTEM**
A Revolutionary E-Mail/BBS Information Host System now makes the setup of a turnkey On-Line Information & Conferencing Utility incredibly easy.
This amazing system can be operated unattended, 24 hours a day, and can simultaneously support up to 16 modems on 16 dial-up telephone lines under nothing more than MS or PC DOS.
*INCL. DUAL 8-PORT DIGI-BOARDS
On-Line Demo Available, Dial-up (805) 656-0379 (8/1/N), or Voice Call:

ONLINE STORE

PHONE (805)
656-3741

**AT&T Cellular
Mobile Phones**
Hands-Free

-- **\$899.00 PLUS TAX** --

INCLUDES *FREE* STANDARD
INSTALLATION IN MASS.

- Delivered UPS anywhere
in the U.S.
- Installed by local authorized
installer.
- Full 2-year warranty.

**Call
Arista Communications
Today!**

(617) 875-4888

* Foreign cars/sports cars
may require additional charge.

Your ad for

Bids And
Proposals

Business
Opportunities

Communications
Marketplace

Consulting
Services

Real Estate

Publications

Seminars
And Conferences

Can be here
for \$327.25

Contact:
Joan Pinsky

1-800-343-6474
x297
(or in MA
617-879-0700)

EMPLOYMENT TODAY

STATE OF CONNECTICUT
Office of Information and Technology
EXECUTIVE DIRECTOR

FUNCTION: Directs the development of fully integrated state-wide data processing and telecommunications systems based on state-of-the-art information technology which effectively and efficiently supports state government agencies in Connecticut.

Directs implementation and operation of a statewide telecommunications network to serve all agencies.

QUALIFICATIONS: Must have a minimum of ten years experience managing a systems and data processing environment and five years managing a telecommunications environment. (These may overlap.)

Must have good interpersonal communication and organizational development skills.

Direct written responses and resumes, no later than July 15, 1987, to:

Bruce Carlson, Policy Development Director
Office of Policy and Management
80 Washington St., Hartford, CT 06106
For further details, call 203/566-8327
-- An Equal Opportunity Employer --

**DON'T
PAY TAXES!**

WORK OVERSEAS

We represent U.S. and foreign companies who are NOW hiring for overseas and domestic positions. You need a minimum of one year experience in your field.

PROGRAMMERS/ANALYSTS

- IMS/CICS/ADABAS/IDMS
- RPG II, III/ORACLE/PCS

SYSTEMS PROGRAMMERS

- PRIMOS/VMS/AOS/MVS

SOFTWARE ENGINEERS

- CAD/CAM/UNIX-C

TECHNICIANS

- IBM MF/HP/DEC-VAX

MANY OTHER FIELDS

Sunday 9:00-3:00
Weekdays 8:30-5:30

(213) 382-9999

**OVERSEAS CAREERS
OF CALIFORNIA AGENCY**

3701 Wilshire Blvd.
Dept. 222NW
Los Angeles, CA 90010

Advance fee required-refundable.
100% GUARANTEE AVAILABLE
Licensed and bonded
as an employment agency.

GUARANTEED RESULTS!!

SYSTEMS TRAINING

- **SR SYSTEMS TRAINER** to \$60K
Solid bkgd in COBOL, JCL, MVS, TSO/SPF a must. Systems exp with good presentation/training skills. NYC brokerage.
- **PROJECT MANAGEMENT
TRAINING SPECIALIST** to \$62K
Must know Systems Project Life Cycle, Project Planning & Project Control. Design, develop & deliver methodology curriculum in a team teaching environment. Heavy on case studies. Knowledge of YOURDON a plus. NYC investment bank.
- **INTERNAL TRAINING
CONSULTANT** to \$45K
Programming bkgd necessary to develop curriculum & do needs analysis for systems professionals. Deal with & hire external technical experts. Knowledge of PCs a must. NYC brokerage.

Resume to or call 212/288-0351

**DALTON MANAGEMENT
CONSULTANTS, LTD.**
244 E. 75th St, NYC, NY 10021

WESTERN WYOMING COLLEGE
POSITION VACANCIES
**DIRECTOR OF MANAGEMENT
INFORMATION SYSTEMS**

Managers computer center and college wide MIS activities. Bachelor's in Business Administration, Computer Science or closely related field is required, together with 5 years of relevant work experience including a background in the development and implementation of manual and automated management information systems. Equivalent combination of education and experience will be considered. Salary: \$32,565-\$39,226, commensurate with qualifications.

**COMPUTER PROGRAMMER/
ANALYST**

Designs and implements computer software systems. Excellent design, documentation and trouble shooting skills required, together with 2 years of relevant work experience. Salary: \$26,913-\$29,605, commensurate with qualifications.

WWC utilizes a McDonnell Douglas 9000 series computer for administrative work and Harris H-100 for academic operations. Preferential treatment consideration will be accorded those candidates with a knowledge of these or similar systems. Outstanding employer paid benefits, modern facilities.


Closing date for receipt of WWC application form, resume and three letters of recommendation is September 4, 1987.

For further information please contact:

**WESTERN WYOMING
COLLEGE**
P.O. Box 428
Rock Springs, WY 82902-0428
(307) 382-1610
Equal Opportunity Employer

**Do you have
ENTREPRENEURIAL
SPIRIT?**

If you have PBX, Data or Network sales experience, are tired of working for corporate bureaucrats and having every proposal decided on price, we would like to speak with you.

Digital Support Systems distributes a full line of telecommunications peripherals. We can offer the right candidate:

- Unlimited earnings potential. Up to \$105,000 in commission on \$700,000 in sales
- A superior product line
- The opportunity to join a professional, highly motivated team of sellers
- The freedom to expand the position according to your skills and ambitions

If you are interested in earning and growing with us, call Richard Cuminal at (716) 381-6838.

**DIGITAL SUPPORT SYSTEMS
INCORPORATED**



شركة ماكدونل دوغلاس للمحودودة للخدمات
MCDONNELL DOUGLAS SERVICES, INC.

**HAS IMMEDIATE OPENINGS IN
Saudi Arabia**

COMMUNICATION SOFTWARE PROGRAMMER
Requires Bachelors Degree in Computer Science, Data Processing, a related scientific or engineering discipline, or equivalent experience. Minimum of ten years experience in IBM systems programming/three years experience in IBM-SNA/VTAM programming which may be concurrent.

BUSINESS PROGRAMMER/ANALYSTS
Requires Bachelors Degree in Computer Science, Data Processing or equivalent. Data processing experience requires seven years/ten years experience in COBOL, TSO, MFS, and IMS in an MVS Environment including experience in analysis and design.

All positions offer a good base pay with a foreign service additive, a cost of living differential and a yearly completion award. In addition, housing, utilities, furnishings and local transportation are provided at no cost. These positions offer an excellent opportunity for travel and career advancement.

If you possess the necessary qualifications please send your resume to:

McDonnell Douglas Service, Inc.
Professional Employment PO62/B73
P.O. Box 516, Dept 5167
St. Louis, Missouri 63166

A SUBSIDIARY OF

**MCDONNELL
DOUGLAS**

An Equal Opportunity Employer
U.S. Citizenship Required



Data Processing

The Lure of Vancouver!

Career Opportunities
Set in the beautiful Pacific Northwest
Affordable Housing
Relocation Assistance
Abundant Recreational Activities

Move to the forefront of telecommunications — and move into one of the most enjoyable communities in the Northwest.

DATABASE ANALYST

Your planning and problem resolution skills will come into play as you support database operations in our expanding IBM, MVS/XA, IDMS environment. This includes implementation and upkeep of physical database structures and database management systems software, as well as the introduction of controls to ensure data integrity. Also, you'll work with Application Development staff to promote proper use of database resources, support changes to the data dictionary, and assist in performance tuning of database management systems and migration of software from test to production environments. In all areas, effective communication skills and current knowledge of technical trends will be essential for success.

Qualified candidates will have an AA/BSCS, or equivalent, with 4 years programming/analysis experience which includes 1 year development/maintenance of large application software systems and use of database management tools. Experience working with ADS/0 and IDMS preferred.

To be considered for a senior level position 2 years of the required experience must have been as a database analyst doing design, implementation and maintenance. Experience working with ADS/ On-line and IDMS database is also required at the senior level.

Our salaries and benefits are very competitive. For immediate consideration, please submit your resume including salary history and requirements to Personnel Analyst, PACIFIC TELECOM, Inc., Dept. NW, P.O. Box 9901, Vancouver, WA 98668-8901. Individuals only apply. Equal opportunity employer M/F/H.



**PACIFIC
TELECOM**

Contel gets COMSAT divisions

continued from page 1

company proposed the merger with COMSAT, by acquiring COMSAT International Communications, Inc.'s (CICI) international private network business and COMSAT Technology Products Inc.'s (CPT) very small aperture terminal network operations.

Contel ASC, a subsidiary providing satellite transmission networks to large businesses and the government, will make the acquisitions. The company will pay \$38 million for the two COMSAT operations.

The CICI business, which builds private-line networks for multinational companies, provides Contel with the international reach the company has sought in efforts to expand its nonregulated businesses, a Contel spokesman said.

The acquisition of CPT's VSAT division, in conjunction with Contel's purchase of Equatorial Communications Co. (see "Equatorial deal adds VSAT market power," page 1), gives Contel "the unique ability to provide a full range of low- to high-end satellite networking products," said Jim Sobczak, Contel's vice-president of marketing and business development.

Sobczak said the two businesses will mesh nicely with Contel ASC's existing satellite operations, resulting in lower costs for the combined units and a unified satellite networking product line.

While Contel spoke highly of the two newly gained COMSAT businesses, analysts said the company paid a high price for little in return. "Thirty-eight million dollars is a lot for two companies whose annualized losses approach \$20 million," said George Dellinger, a senior analyst with Washington Analysis Corp. in Washington, D.C.

COMSAT would not verify that figure but said the two operations lost \$10.3 million before taxes in the first six months of 1987.

Dellinger said he is skeptical that Contel can reverse the fortunes of either business. CICI is up against 10 or more formidable competitors in the international private network market, he noted, and the CPT operations involve not only selling VSAT nets but manufacturing VSAT equipment. "Service companies like Contel always bomb out when they try their hands at manufacturing," he said. "It's like oil and water."

William Rehe, vice-president of Enterprise Network Strategies for Stamford, Conn.-based Gartner Group, Inc., agreed that the deal was a pricey one for Contel, but he expressed confidence the Equatorial and COMSAT VSAT investments could make Contel a VSAT leader.

Contel's acquisitions are an integral part of a strategy crafted by President and Chief Executive Officer Donald E. Weber to increase Contel's presence and profits in nonregulated communications markets. Despite substantial holdings, Contel's nonregulated operations contribute only 10% of the company's total earnings.

But Weber, who three months ago replaced John N. Lemasters, has also publicly stated his intent to "maximize long-term stockholder value," which he said may result in the shedding of divisions with poor financial performance.

Two potential candidates for such action, analysts said, are Contel's Federal Systems Sector, which sells computer and communications gear to the federal government, and Contel Executone, an interconnect company.

When asked last week to verify that the company is considering selling unprofitable operations, a

Contel spokesman said only that he "would not argue" with the statement. Contel executives declined to be interviewed on the matter.

Weber has cited "employee morale and contract backlog problems" in Contel's Federal Systems Sector and has said he is scrutinizing Contel's Executone operations for "an indication of an earnings turnaround."

The Federal Systems Sector had a 4% profit of \$13 million on \$297 million in revenue in 1986. Executone contributed to a \$12.4 million loss in 1986 for Contel's Business Systems Sector, which also includes Contel Computer Systems.

"If the president of Contel speaks that bluntly about it, Contel is looking for buyers for Executone and possibly for the Federal Systems division," said Harry Carrel, an analyst with Northern Business Information, Inc.

Howard Frank, a member of the Contel Board of Directors and chairman of Network Management, Inc., said, "It's conceivable that Executone will be sold — Contel regularly divests of businesses that aren't doing well or don't fit into its strategic direction."

But Frank insisted that Federal Systems is "part of Contel's overall game plan." He said recent management changes within the division underscore Contel's commitment to getting the sector back on track.

Carrel said he hopes the company won't commit the same errors it has in the past in its scramble for big profits.

"Contel has merger-and-acquisition-itis," he said. "It too easily gets carried away trying to make its stock look good. They've just bitten off more than they can chew, and now Weber has to pull some fingers out of some pies." □

CALENDAR

July 15-17, San Francisco — Network Wiring Techniques. Also, Aug. 5-7, Boston; Aug. 12-14, Chicago. Contact: Datacomm Group, 55 Main St., Madison, N.J. 07940.

July 20-21, Denver — Commercial Image Processing Markets '87: Present and Future. Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

July 20-21, Chicago — Understanding ISDN. Also, July 23-24, Washington, D.C.; Aug. 26-27, Toronto. Contact: Telecommunications Research Associates, P.O. Box 1200, Newark, Ill. 60541.

July 20-22, Arlington, Va. — Private Fiber Network Opportunities Conference. Contact: TeleStrategies, Inc., Suite 100, 1355 Beverly Road, McLean, Va. 22101.

July 21, Chicago — TCP/IP WIN/3B Networking. Contact: Registrar/Data Communications and Network Training, AT&T, P.O. Box 45038, Jacksonville, Fla. 32232.

July 22-24, New York — Introduction to Data Communications and Networking. Also, Aug. 3-5, Boston. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

July 26-30, Minneapolis — ACUTA 16th Annual Conference. Contact: Association of College & University Telecommunications Administrators, 211 Nebraska Hall, Lincoln, Neb. 68588.

July 27-28, Toronto — Understanding Data Communications — A Practical Guide. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

July 27-28, Chicago — Understanding IBM Systems, Products and SNA. Also, Sept. 14-15, New York. Contact: TeleStrategies, 1355 Beverly Road, McLean, Va. 22101.

July 27-31, Anaheim, Calif. — SIGGRAPH '87. Contact: The Special Interest Group on Computer Graphics, Suite 600, 111 East Wacker Drive, Chicago, Ill. 60601.

July 28-29, Toronto — Corporate Connectivity and Micro-Mainframe Links. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

July 30-31, New York — Networking Personal Computers. Also, Sept. 28-29, Washington, D.C. Contact: School of Continuing Education, New York University, 575 Madison Ave., New York, N.Y. 10022.

Aug. 3-6, Cupertino, Calif. — Advanced Computing Environments at Techmart Tutorial Sessions. Contact: Advanced Computing Environments, 21370 Vai Ave., Cupertino, Calif. 95014.

Network World Sales Offices

BOSTON
Donna Pomponi, District Manager
375 Cochituate Rd., Box 9171
Framingham, MA 01701-9171
(617) 879-0700

NEW YORK
Paul Bonington, District Manager
Paramus Plaza 1, 140 Route, 17 North
Paramus, NJ 07652
(201) 967-1350

NEW JERSEY/PHILADELPHIA
Joan Daly, Eastern Regional Manager
Paramus Plaza 1, 140 Route, 17 North
Paramus, NJ 07652
(201) 967-1350

WASHINGTON, D.C.
Bill Burke, District Manager
2133 Defense Highway, Suite 205
Crofton, MD 21114
(301) 721-4763

SAN FRANCISCO
Chris Clyne, Western Regional Manager
3350 West Bayshore Rd., Suite 201
Palo Alto, CA 94303
(415) 328-4618

ATLANTA
Tom Tolbert, District Manager
1400 Lake Hearn Dr., Suite 330
Atlanta, GA 30319
(404) 394-7509

CHICAGO
Fran Jonikaitis, District Manager
2600 South River Rd., Suite 304
Des Plaines, IL 60018
(312) 827-4433

LOS ANGELES
David Pronenko, District Manager
18004 Sky Park Cir., Suite 100
Irvine, CA 92714
(714) 250-3006

CLASSIFIED ADVERTISING
Joan Bayon Pinsky, Account Executive
375 Cochituate Rd., Box 9171
Framingham, MA 01701-9171
(617) 879-0700

Network World Headquarters

375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171, Phone: 617 879-0700, Telex: 95-1153, FAX: 617 875-8931

Ron Mastro
National Sales Director

Pam Valentinas
Manager/Marketing &
Sales Operations

Karen Wallace
Account Coordinator

PRODUCTION Production Director, Peter Holm, Senior Production Manager, Leigh Swearingen, Production Coordinator, Christopher P. Cuoco
CIRCULATION Corporate Distribution Manager, Robert W. Wescott, Circulation Manager, Richard Priante

Network World is a publication of IDG Communications, the world's largest publisher of computer-related information. IDG Communications publishes over 80 computer publications in more than 28 major countries. Fourteen million people read one or more IDG Communications publications each month. IDG Communications publications contribute to the IDG News Service offering the latest on domestic and international computer news. IDG Communications publications include: ARGENTINA'S Computerworld Argentina, PC Mundo; ASIA'S Communications World, Computerworld Hong Kong, Computerworld Indonesia, Computerworld Malaysia, Computerworld Singapore, Computerworld Southeast Asia, PC Review; AUSTRALIA'S Computerworld Australia, Communications World, Australian PC World, Australian Macworld; AUSTRIA'S Computerwelt Oesterreich; BRAZIL'S DataNews, PC Mundo, Micro Mundo; CHILE'S Informatica, Computacion Personal; DENMARK'S Computerworld Danmark, PC World Danmark; FINLAND'S Mikro, Tietoviikko; FRANCE'S Le Monde Informatique, Distributique, InfoPC, Le Monde Des Telecoms; GREECE'S Micro and Computer Age; HUNGARY'S Computerworld SZT, Mikrorilag; INDIA'S Dataguest; ISRAEL'S People & Computers Weekly, People & Computers Biweekly; ITALY'S Computerworld Italia; JAPAN'S Computerworld Japan; MEXICO'S Computerworld Mexico; THE NETHERLANDS' Computerworld Netherlands, PC World Benelux; NEW ZEALAND'S Computerworld New Zealand; NORWAY'S Computerworld Norge, PC World Norge; PEOPLE'S REPUBLIC OF CHINA'S China Computerworld, China Computerworld Monthly; SAUDI ARABIA'S Arabian Computer News; SOUTH KOREA'S Computerworld Korea, PC World Korea; SPAIN'S Computerworld Espana, Commodore World, PC World Espana, Comunicaciones World, Informatica Industria; SWEDEN'S ComputerSweden, Mikrodatorn, Svenska PC World; SWITZERLAND'S Computerworld Schweiz; UNITED KINGDOM'S Computer News, DEC Today, ICL Today, PC Business World; UNITED STATES' Amiga World, Boston ComputerNews, CD-ROM Review, Computerworld, Computers In Science, Digital News, Federal Computer Week, 80 Micro, FOCUS Publications, InCider, Inforworld, Macworld, Computer + Software News (Micro Marketworld/Lebhar-Friedman), Network World, PC World, Portable Computer Review, Publish! PCResource, Run; VENEZUELA'S Computerworld Venezuela; WEST GERMANY'S Computerwoche, PC Welt, Run, Information Management, PC Woche.

► PRODUCT REVIEW

Telephone tag alternative

Voice messaging unshackles users from traditional telephone limitations.

BY JOHN J. HUNTER
Contributing Writer

Users looking for a way to eliminate telephone tag, missed calls and garbled messages should investigate voice-messaging systems. While these systems aren't perfect, they're definitely superior to the pad-and-pencil approach.

Voice-messaging products conjure up many different images. Some users think of them as telephone answering machines; others view them as voice bulletin boards. But most voice-messaging products go beyond those services and establish individual and system mailboxes where callers can deposit and receive messages. They also distribute messages to users on the same network or on different networks.

Some voice-messaging systems are automated attendants that supplement the live company telephone operator and invite the caller to enter the extension number of the desired party and leave a message. Other systems go further by providing a mailbox for each user. The more sophisticated voice-messaging systems also let users establish distribution lists for broadcasting messages to groups of users.

Two sophisticated voice-messaging systems that incorporate these features are the Aspen Maxum from Octel Communications Corp. of Milpitas, Calif., and the 5000 Series from VMX, Inc. in Dallas. Both products integrate with Centrex and a variety of private branch exchanges, and both support message-waiting indicators and call forwarding. The two systems also let users send personalized greetings to callers who reach a busy or unattended phone and let the caller access the mailbox or talk to the operator.

The Octel and VMX units can place calls to off-site locations through an out-calling facility. This permits mailbox holders to have calls sent to temporary or permanent outside telephone numbers, such as home phones, and is ideal for telecommuters or other employees working away from the office. The caller can even mark urgent messages for immediate delivery.

Voice mail essentials

Like all voice-messaging systems, the Octel and VMX units operate behind the PBX or Centrex system, interfacing with the switching system's trunks and lines. The analog voice inputs are digitized via a coder/decoder and the quantized voice is stored on disk. The 5000 Series digitizes

voice at 16K bit/sec, while the Maxum digitizes it at 25K bit/sec.

Message-storing capacity, which is usually expressed in hours, is a key feature of voice-messaging systems because it ultimately determines their capability. To conserve space, the Octel and VMX units store data in compressed mode, which means that they don't record silent periods in a message. Both companies offer field-installable disk packs to increase capacity. However, the storage techniques these systems use differ greatly.

they can also enter the called party's last name to receive a list of mailbox holder candidates.

If callers don't know the extension, they can enter the called party's last name. The caller then receives a list of employees with similar names. Prompted by the system, the caller then enters a digit for the desired box holder. If the PBX permits, callers can connect directly to the mailbox if the called party is unavailable. VMX says that it is working on a directory that allows callers to enter the last name of a called party. After

box distribution lists. Each list can contain an unlimited number of mailbox numbers. The VMX unit puts no limits on the number of distribution lists or on how many mailbox numbers are in each list.

In addition to allowing message distribution within a node, both systems permit networking among their own nodes. Neither will communicate with voice-messaging systems from other vendors, but they are compatible with other proprietary messaging systems.

The Octel and VMX systems provide several flexible schemes for networking. For example, the network manager could use a unique numerical designator code for each node and mailbox, or it could use something as simple as the area code where the node is located. The last three or four digits of the recipient's telephone extension could be the mailbox address. Both products allow an unlimited number of nodes to be configured.

Unlike the Octel unit, the VMX 5000 Series is among the select group of voice-messaging systems that interface with E-mail services. (Others include AT&T, Rolm Corp., Voicemail International, Inc., American Telesystems Corp., Comverse Technology, Inc., Natural Microsystems Corp., Periphonics Corp., Xerox Corp., and Zymacom, Inc.) It is compatible with Digital Equipment Corp.'s VAX/Mail and All-In-1 and IBM's Professional Office System.

But while most integrated systems are limited to notifying users that voice or E-mail messages are waiting, the 5000 Series is one of only two systems (Zymacom's In-

formation Exchange is the other) that can convert text messages to voice. Voice-to-text conversion is currently unavailable from any vendor.

Through integration, these

voice-messaging systems can use PBX services to handle messages. The Octel and VMX units, for example, will forward an unanswered call to the called party's personal greeting, will transfer the call to the PBX operator and will light a message-waiting lamp on the called telephone or alter its dial tone to indicate that a message is waiting. Both systems can integrate with a wide variety of PBXs and with Centrex.

In summary, both products are about even with regard to overall services. Primary differences occur in the number of ports, amount of storage supported and cost. For companies that want to integrate E-mail with voice messaging, the VMX has the edge. □

Two voice-messaging systems compared

	Vendor/Product	
	Octel Communications Corp. Milpitas, Calif./ Aspen Maxum	VMX, Inc. Dallas/ 5000 Series
Number of ports	4 to 72	4 to 64
Storage hours	6 to 304	13 to 526
Price	\$25K (4 ports, 6 hours, \$600K (72 ports, 304 hours)	\$35K (4 ports, 13 hours, \$430K (64 ports, 150 hours)

SOURCE: TMS CORP., DEVON, PA.

The Maxum uses a proprietary scheme in which storage space for digitized voice is dynamically allocated as needed. Octel calls this "sectorless storage." The company says that no disk space is wasted because the system uses only the amount of storage space needed to hold each message. By contrast, sectorized disk techniques allocate storage space in blocks. Since any unused portion of a sector can't be allocated to another message, this technique wastes space if a message takes up only a small portion of one sector.

According to Maren Symonds, Aspen group product manager, Octel uses the sectorless storage technique throughout its product line. The VMX 5000 Series, however, uses 10-second wide "sectors" called voice-block sections. Using this method, the most space that could be wasted per message is nine seconds, according to Harry Budow, market research analyst at VMX.

Both the Octel and VMX units are easy to use. Callers access the systems through push-button telephones, using the telephone's Dual Tone Multi-Frequency signaling to activate system options and enter passwords.

The 5000 Series and Aspen units provide prompts that can be used by inexperienced callers; those more familiar with system operations can skip ahead by entering the appropriate codes.

In both units, the automated attendant answers, states the options and prompts the user to press the appropriate key for the desired service. Callers can then enter the extension or voice mailbox number, if known. With the Maxum,

recording a message, the caller has the option of reviewing and changing it. For internodal messages, the user can also mark the message "urgent" for faster delivery.

Both systems group messages for remote node delivery to eliminate the time-consuming process associated with node communications initialization. They also schedule deliveries, when possible, to coincide with the most favorable telephone rates. However, messages marked as urgent are delivered immediately.

The Octel and VMX systems transmit messages via analog telephone facilities. Depending on message volume, this can be a drawback, as each second of recording involves 16K or 25K bits of disk storage. VMX offers a facility called Turbo Voice that achieves a 30% reduction in transmission time by shortening the handshaking protocol and transmitting data in compressed format.

The Octel and VMX systems also support message-distribution lists. A distribution list simplifies the process of writing messages by grouping target mailbox numbers. After recording a message, the sender enters the mailbox numbers onto a distribution list, using a telephone keypad. After that, the user simply enters the distribution list number, and the system does the rest.

The Octel unit allows each mailbox holder to have up to 25 mail-

Message-storing capacity is a key feature of voice messaging.

If AT&T could run this ad, they would. They can't.

If AT&T was ever going to have a nationwide 100% digital fiber optic network, they'd say so.

They can't.

If AT&T had a travel card with quality and savings equal to the FÖNCARDSM, they'd brag about it.

They can't.

If AT&T had the best overall prices among major long-distance carriers, they'd tell you about that.

They can't.*

If AT&T was the fastest-growing major long-distance company in America, they'd sure let you know.

They can't.

We can.

Sprint is smart.SM



1-800-527-6972

*Further US SprintTM rate reductions coming August 1, 1987. That means, US Sprint will have reduced its rates 20% in the last year alone.